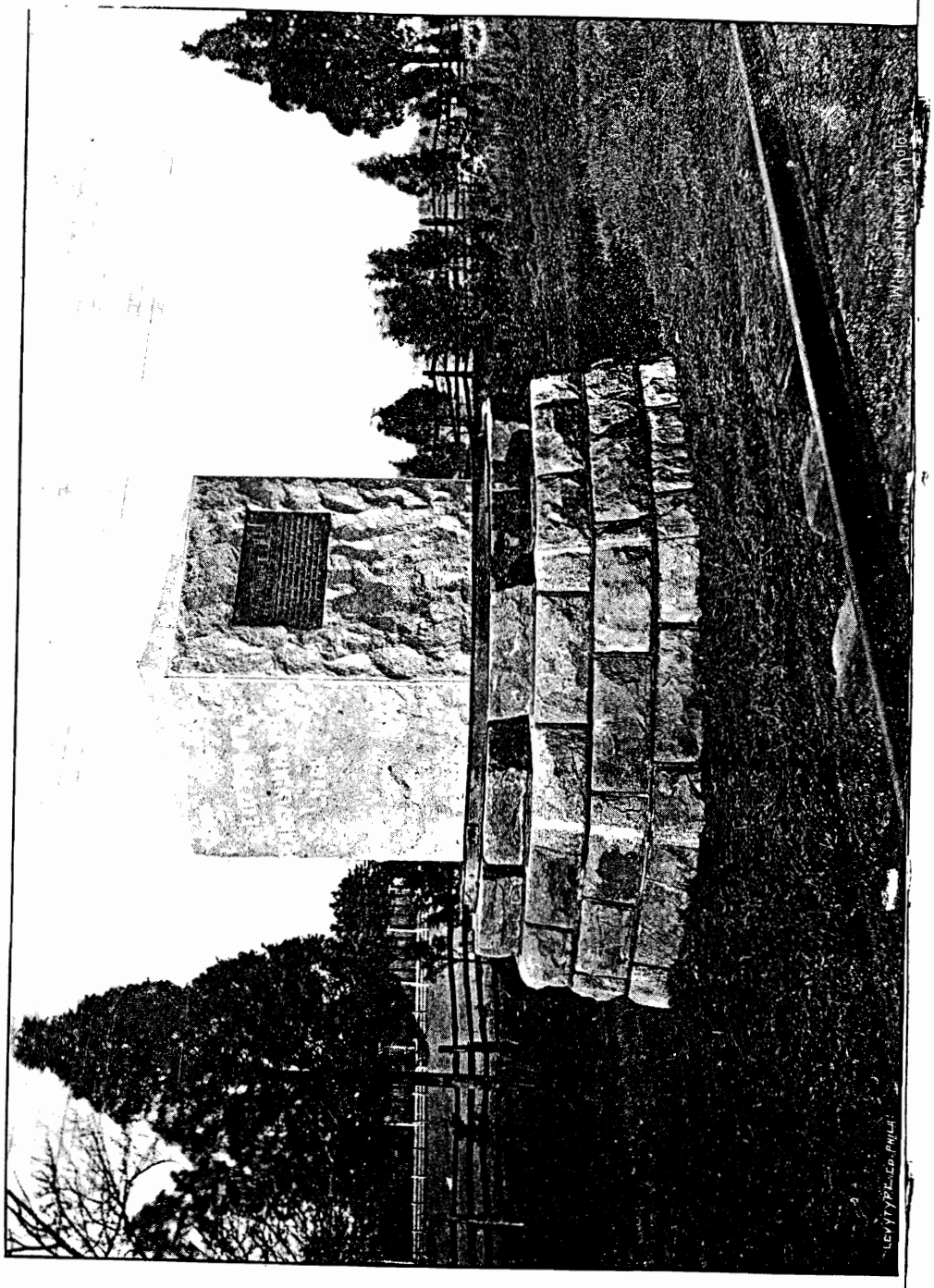



# The Camden and Amboy Railroad

## ORIGIN AND EARLY HISTORY

BY

J. Elfreth Watkins, C. E.

Curator: Section of Transportation and Engineering, U. S. National Museum, Smithsonian Institution; Assoc. Am. Soc. C. E.; Member American Historical Association.

Address delivered at Bordentown, N. J.,
November 12th, 1891,
upon the
completion of the monument
erected by the Pennsylvania Railroad Company to mark the first piece of track laid between New York and Philadelphia; and to commemorate the Sixtieth Anniversary of the first movement by steam upon a railway in the State of New Jersey, November 12, 1831.



Press of Gedney & Roberts,
Washington, D. C.

# WHO ARE THE HEROES?

Read by the author at the

"EVENING WITH RAIL ROAD MEN,"

Camden, N. J., Feb 11th, 1884,

AND RESPECTFULLY INSCRIBED TO THE

Employees of the Amboy Division.

BY THOMAS B. APPLEGET.

Let others sing of Bludsoe, Bradley, Guild—
Well they deserve kind memory and a tear—
But he who holds his manhood undefiled,
Loyal to lowly duty, is their peer.

Are there no living heroes? Must men die
To be accounted noble, true and brave?
Are all the laurel wreaths woven to lie
On pale, unconscious brows, cold in the grave?

Is there no meed of praise for him who stands
True at his humble post, whose eye unclosed
Foresees the danger, and whose faithful hand
Holds free from harm the sacred trust imposed?

To go when duty calls from fireside warm,
To walk the track with ever watchful eye,
To bear the red-light through the driving storm,
Or stand to brakes when sleety crystals fly.

To hold a lever and to watch a gauge,
To set a switch, or give a signal true,
To tap a wheel, or drive a spike—a sage
Might call these trifles—but do you?

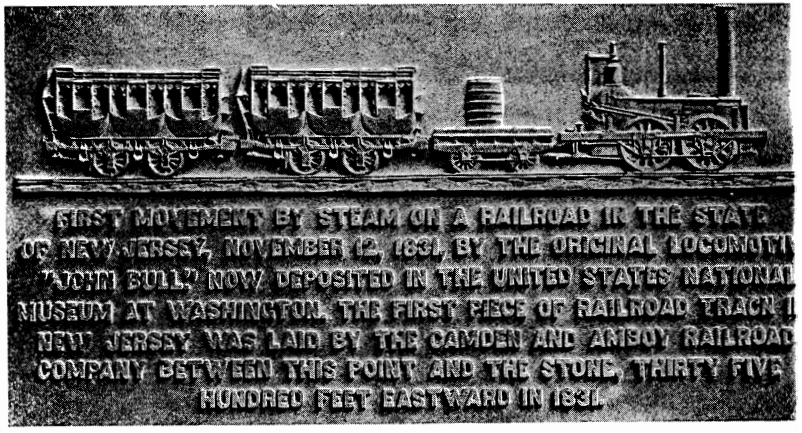
Let one of these be slighted, only one—
These daily duties of ten thousand men—
And somewhere comes the crash, the shriek, the groan;
Somewhere the roll of death is called again.

I can not think the smoke of martyrdom
From burning wrecks of human life, will rise
The sweetest incense that shall ever come
From off the altars of our sacrifice.

I can not think that He, who said "well done,"
Unto the one who in "few things" was true,
Will lightly hold us if, from sun to sun,
We faithful prove in that we have to do.

Give honor to the martyrs—those who fall,
And falling have their crown of glory won:
But honor, too, the living heroes, all
Who living lay no duty down undone.

All reverence for the dead. Let anthems ring
Above their graves, and peaceful be their rest.
This honest tribute of respect I bring
To every man who does his level best.




BRONZE TABLET,

RAILROAD MONUMENT, AT BORDENTOWN N. J.

Cast by John Williams, New York City.
Model by Theodore A. Mills, Washington, D. C.

# THE RAILROAD MONUMENT

AT

## BORDENTOWN, N. J.

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The Railroad Monument at Bordentown, erected by the Pennsylvania Railroad Company, was completed in 1891. It is composed of a cube of Baltimore granite, five feet square and seven feet high, supported upon an octagonal foundation composed of the stone blocks upon which the iron rails were originally laid in the tracks of the Camden and Amboy Railroad. Around this cube is a circle composed of two of the original iron rails with which the road was first laid. These rails are supported by stone blocks according to the original practice, the spikes and joint fixtures also being from the original track. This type of rails, which is now known throughout the world as the "American Rail," was designed by Robert L. Stevens for and first laid upon the Camden and Amboy Railroad in 1831. Sunk in the south side of the granite block is a bronze tablet, which contains a representation (carefully drawn to scale), in relief, of the locomotive "John Bull," with tender improvised from a freight truck with tank consisting of a whiskey hogshead and the two passenger cars that first did service in the State of New Jersey in 1831.

The tablet contains the following inscription in raised letters:

FIRST MOVEMENT BY STEAM ON A RAILROAD IN THE STATE OF NEW JERSEY, NOVEMBER 12, 1831, BY THE ORIGINAL LOCOMOTIVE "JOHN BULL," NOW DEPOSITED IN THE UNITED STATES NATIONAL MUSEUM AT WASHINGTON. THE FIRST PIECE OF RAILROAD TRACK IN NEW JERSEY WAS LAID BY THE CAMDEN AND AMBOY RAILROAD COMPANY BETWEEN THIS POINT AND THE STONE, THIRTY-FIVE HUNDRED FEET EASTWARD, IN 1831.

Upon the east side of the block cut into the granite are the words

"CAMDEN AND AMBOY RAILROAD, 1831,"

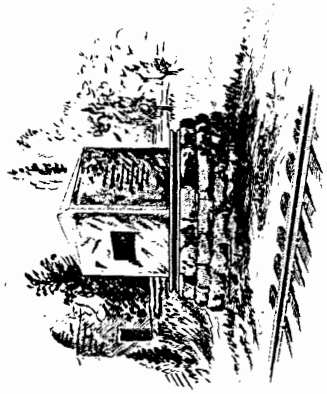
and on the west

"ERECTED BY THE PENNSYLVANIA RAILROAD COMPANY, 1891."

The design, drawings and specifications of the monument were prepared by Dr. G. Brown Goode, Assistant Secretary of the Smithsonian Institution; Mr. J. Elfreth Watkins, Curator of the Section of Transportation and Engineering, United States National Museum, Washington, and Mr. Joseph T. Richards, Assistant Chief Engineer, Pennsylvania Railroad Company. They were approved by the President, Vice-Presidents and General Manager of the Pennsylvania Railroad Company, and the construction was authorized by the General Manager.

In the work of construction and in the collection of old track material Mr. Richards was zealously assisted by Mr. Robert P. Snowden, Assistant Engineer of the Amboy Division, and the corps of employés under his direction. This work, begun in 1886 under the administration of Superintendent W. N. Bannard, was completed November 11, 1891, Mr. Frank Ellmaker being at that time superintendent of the Amboy Division.

The tablet was cast by John Williams, of New York City, from a model by Theodore A. Mills, of Washington, D. C.



*Mr. Monument of the*

*Pennsylvania Railroad Company*

*request your presence at Bordentown, N. J.*

*upon the sixtieth anniversary of the*

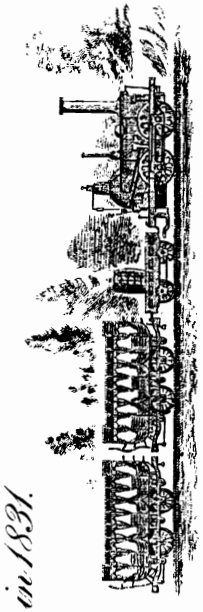
*First movement by Steam upon a Railway in the State of New Jersey*

*on Thursday, November 12th 1891 at 3 o'clock P.M. to participate in the ceremonies incident to the*

*completion of the Monument erected to mark the*

*first piece of track laid between New York & Philadelphia by the*

*Camden & Amboy Railway Company in 1831.*



*Committee*

*J. T. Richards, Chairman. J. Wolcott Jackson,*

*Asst. Chief Engr. P. R. R. Gen. Supt. W. N. & P. R. R.*

*Frank Ellmaker*

*Supt. C. & A. Div.*

# PROGRAM

OF THE

CEREMONIES AT BORDENTOWN, N. J.
NOVEMBER 12, 1891,
Three o'clock p. m.
upon the

## COMPLETION OF THE MONUMENT

erected by the Pennsylvania Railroad Company to mark the first piece of track laid between New York and Philadelphia, and to commemorate the

## SIXTIETH ANNIVERSARY

of the first movement by steam upon a railway in the State of New Jersey, November 12, 1831.

ADDRESS OF PRESENTATION, BY JOSEPH T. RICHARDS,
Assistant Chief Engineer,
Pennsylvania Railroad Co.

ADDRESS OF ACCEPTANCE, BY F. WOLCOTT JACKSON,
General Superintendent
United Railroads of N. J., Division
Pennsylvania Railroad Co.

HISTORICAL ADDRESS: The Camden and Amboy Railroad—origin and early history—by J. ELFRETH WATKINS,
Curator; Section of Transportation and Engineering, U. S. National Museum, Smithsonian Institution, Washington.

Special train for the accommodation of invited guests will leave Station foot of Federal Street, Camden, N. J., on arrival of the 1.30 p. m. boat from foot of Market Street, Philadelphia.

GEDNEY & ROBERTS

(*Fac-simile.*)

If there prove to be anything of permanent value in this history, I desire that it be remembered in connection with the memory of the late Colonel Isaac S. Buckelew, for many years Superintendent of the Amboy Division, Pennsylvania Railroad Company, under whose guidance many of the facts here recited were collected and compiled, and without whose encouragement these pages would not have been written. The author, who pursued this work during a service extending over fifteen years upon the railroads of New Jersey controlled and operated by the Pennsylvania Railroad Company, desires also to make acknowledgment of the valuable assistance rendered by the late Benjamin Fish, President of the Freehold and Jamesburgh Agricultural Railroad; Ashbel Welch, President and afterwards Chief Engineer of the United New Jersey Railroad and Canal Company; John G. Stevens, President of the United New Jersey Railroad and Canal Company, and Robert C. Busby, of the Amboy Division, all of whom have passed away. Also for the aid given by Dr. Francis B. Stevens, of Hoboken, New Jersey; Isaac Dripps, sometime Master Mechanic of the Camden and Amboy Railroad; Leroy H. Anderson, Secretary of the United New Jersey Railroad and Canal Company; F. Wolcott Jackson, General Superintendent of the United Railroads of New Jersey Division of the Pennsylvania Railroad, and by Samuel L. Roberts, of the Amboy Division. If the facts here narrated shall stimulate historical research or lead the other pioneer railroads of America to follow the example of the great Pennsylvania Railroad and make a similar permanent record of the beginnings of steam transportation on this continent, I shall feel amply repaid for the time consumed in this task.

SMITHSONIAN INSTITUTION,
*November 11, 1891*

# THE CAMDEN AND AMBOY RAILROAD.

## ORIGIN, EARLY HISTORY, AND PRESENT POSITION IN A CONSOLIDATED RAILWAY SYSTEM.

BY J. ELFRETH WATKINS, C. E.

Curator of the Section of Transportation and Engineering,
U. S. National Museum, Washington.

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The wheel is a dial by which can be reckoned the degree of progress of every civilization

When a people learn how to make and use it, the crooked ways are made straight—the rough places smooth. Footpaths are replaced by level highways, bridges are built over streams once forded, intercommunication is accelerated, commerce is stimulated, and a rapid national development follows. Such is the sequence of events frequently recorded in the history of the remote past, a history again forcibly repeated in this century of progress, when the construction of the iron highway closely followed the invention and perfection of the steam-driven wheel, the introduction of which in America united North and South and East and West in one grand empire.

From the beginning mankind has been equally dependent upon the road-maker and the wheelwright for safe and rapid movement over land. So we, who are assembled here to-day to view the handsome stone erected by a generous parent to commemorate an important event in the infancy of an adopted child, are glad to pay homage to the memories of Watt, Trevithick, the two Stephensons, and the other mechanical engineers whose genius made it possible, here, to put the iron horse to work on the Camden and Amboy Railway, in the first movement by steam in the State of New Jersey, three-score years ago to-day.

Nor shall we fail to recall with gratitude the remembrance of the labor of the great civil engineer who designed the original rails — the type now in use in many lands, but first laid upon the ground on which we stand — the beginning of the first iron highway that connected the Metropolis of the Nation with its greatest rival — the Quaker City.

It is a refreshing sign when busy men like yourselves break away from the seductive, bustling activity of the office to indulge, even for a brief period, in retrospection: ceasing to mould the future while you pause to contemplate the past.

While all delight to boast of the rapid strides made during this generation in every branch of industry, it is an indication of human advancement when thinking men find much satisfaction in looking backward: in celebrating the anniversaries of important events, and in otherwise recalling, with grateful appreciation, the good work of the pioneers who removed the first obstacles from the path of progress.

It is eminently fitting, upon this anniversary of an event so important in both State and railway history, that we shall place upon record the circumstances that led to the inception of the Camden and Amboy Railway Company, the historic corporation that, immediately upon its organization, grew so rapidly in extent and importance that it became the greatest power in the State, while its influence was felt everywhere throughout the northern seaboard.

Let us review, briefly, the events that preceded the incorporation of this, the first railway in the State of New Jersey.

## Colonial Transportation Routes.

As early as 1675 the Council, whose functions were similar to the present Senate of New Jersey, adopted the first regulations in regard to the location of wagon roads,* and in 1682

*The sparse population of New Jersey at that time is indicated by the following approximate census of the various settlements in the State in 1680: Province of West Jersey: New Salem, population 60 families; Burlington, 140. Province of East Jersey: Bergen, 70; Newark, 90; Elizabeth, 80; Shrewbury, 70; Perth Amboy, 60.

New York, which was settled in 1609, had, after a growth of 70 years, become the most important seaport in America. Philadelphia was not settled until 73 years after (1682), but so rapid was the growth of that city that it equaled New York in population in 1735, and continued to have the largest population for many years.



(the year Philadelphia was settled) two roads across the State, which afterwards became routes between Philadelphia and New York, were opened according to law.

Sloops then ran from New York to Elizabethtown Point, on Newark Bay, from which point a road had been opened to the Raritan river, near where New Brunswick is now located, where the river was easily forded at low water. This road continued to a point on the Delaware river, a few miles above Trenton, where that river is shallow; there another ford was located. This was called the "upper road." The other or "lower road" branched off from this upper road at a point five or six miles west of the Raritan, sweeping somewhat toward the east and arriving at the shores of the Delaware at the present site of the City of Burlington.

In 1683 the proprietors of West Jersey petitioned Deputy-Governor Laurie to discover "whether there may be a convenient road between Perth town (Perth Amboy) and "Burlington for the entertaining of a land conveyance that "way," and in 1684 a sailing ferry-boat, the first on this route, was put on the river between Perth Amboy and New York, "to entertain travelers," the intention being to cause the public road to pass through Perth Amboy, which subsequently had a large trade with the East Indies and other foreign ports, and which was a rival of New York in obtaining the commerce from New York State and New England, en route to West Jersey and Pennsylvania. But the other road continued to be the popular one.

## The First "Monopoly."

In 1707 the Assembly complained to Lord Cornbury "that "patents had been granted to individuals to transport goods "on the road from Amboy to Burlington for a number of "years, to the exclusion of others."

This was denounced as being contrary to the statute respecting monopolies, and "destructive to that freedom which "trade and commerce ought to have."

The Governor took the part of Dellaman, to whom the right of the road was given, and in favoring this "monopoly" in his answer, said: "At present every one is sure, once a fort-

"night, to have an opportunity of sending goods at reason-
"able rates, without danger of imposition; and this wagon is
"far from being a grievance or monopoly, for *by this means,*
"*and no other*, a trade has been carried on between Phila-
"delphia, Burlington, Amboy and New York, which was
"never known before and which in all probability never
"would have been." Thus even at that early day was a cry raised against "Monopoly" by those who were too short-sighted to see in it the door to industrial and commercial development.

## Ferries and Stage Routes.

In 1697 the privilege of the ferry at New Brunswick was granted to John Inians and wife, and for many years the present site of that city was called Inians' Ferry.

In 1716 an act was passed "confirming all roads six and four "rods wide as highways."* The rates of ferriage were also established by law, and "Billop's Ferry," from Staten Island to Perth Amboy, and "Redford's Ferry," from Perth to South Amboy, were established soon afterwards.

## Route between Philadelphia and New York Established.

In 1751 Joseph Borden put a stage-boat on the Delaware river and advertised that he would "attend at the Crooked-
"billet wharf, Philadelphia, every Tuesday, and proceed to
"Bordentown on Wednesday." "On Thursday a stage-
"wagon, with good awning, kept by Joseph Richardson, will
"convey passengers and goods to John Cheek's house, oppo-
"site Perth Amboy, and on Friday a well-fitted stage-boat,
"kept by Daniel O'Bryant, will proceed to New York." And it was said, "'Tis believed this is thirty or forty hours the "fastest way yet made use of."

Little had been done at that time to improve the common roads. Governor Franklin, in an address to the Assembly in 1768, said: "Even those (roads) which lie between the two "principal trading cities in North America are seldom pass-
"able without danger and difficulty."

*All wagon wheels were required to be 4 ft. 8½ inches apart, "turnpike width."



Previous to the Revolution an all-stage route was established from Philadelphia, via Trenton, to Elizabethtown. The stages, called flying machines, carried passengers "through in
"two days in summer and three in winter, at three pence per
"mile, the length of time consumed being on account of the
"miserable roads."

It will be remembered that during a greater part of the Revolution the British army held possession of New York, the Continental army having control of Philadelphia. During these years business of all kinds between these two great cities was practically suspended, the country lying between Philadelphia and New York being a continuous battlefield.

The transportation of cannon and Government stores during this war called public attention to the miserable public roads, and after peace had been declared and business became established upon a firmer basis, the necessity for improvement became still more urgent. From 1785 to 1790, while the seat of the General Government was in New York City, almost all the land travel from the South and West passed through Philadelphia, Bristol, Pa., Trenton, Princeton (then the capital of New Jersey), Elizabethtown, thence by boat to New York, or through Newark to Jersey City, the bridges across the Hackensack and Passaic not being built until 1790–95.

In 1804 the first bridge across the Delaware, at Trenton, was completed. Passengers then left Philadelphia by a tri-weekly line of stages at 4 A. M., arriving in New York at 7 or 8 o'clock the same evening.

A line of sloops conveyed freight at this time from New York to Perth Amboy and thence up the Raritan River to New Brunswick, from which point it was hauled in wagons to South Trenton, where the freight was again transferred to sail-boats and shipped to Philadelphia. Owing to the ice in the river this route was closed during the winter, so that much of the freight at that time of the year en route for Philadelphia was hauled by wagon, via Morrisville and Bristol, or to Camden, via Sand Hills.*

The country did not long remain in a state of peace. During the war of 1812 the bad roads between Trenton and New

*Four miles east of Bordentown.

Brunswick were again a source of much delay in the transportation of Government stores. During this war, "in the "summer of 1814, Fish & Howell, a transporting firm (afterwards Hills, Fish & Abbey) transported cannon from a "Government vessel at South Trenton to New Brunswick, en "route for New York." *

## Early Turnpikes.

The attention of the inhabitants of the interior portions of the State had long been directed to the subject of turnpikes. During the early part of the century nine turnpikes on the route from Philadelphia to New York were chartered.†

Before February 1, 1828, fifty-four turnpike companies had been chartered by the State and 550 miles of turnpikes had been constructed, nearly all with a superstructure of gravel; less than five miles being improved by broken stone.

The turnpike through New Brunswick, Kingston, and Princeton was the favorite stage route for many years. Kingston was a celebrated place in those days, and "Withington's Tavern," where the horses were always changed, acquired a great reputation.

Some idea of the volume of the stage business can be gathered from the fact that "forty-nine stages loaded with "passengers have been known to halt here at the same time,

* See Memoir Benjamin Fish, 1880.

† The first turnpike chartered by the State Legislature was the Morris turnpike, March 9, 1801. It extended from Elizabethtown through Morristown and Newton to the Delaware, opposite Milford.

Nov. 30, 1802, the Hackensack and Hoboken turnpike was chartered (Supplement, Nov. 16, 1807).

Nov. 14, 1804, this was followed by the Trenton and New Brunswick (Supplement, Nov. 28, 1806, and Feb. 1, 1814).

Dec. 6, 1804, Jersey City and Hackensack turnpike (Supplement, Nov. 4, 1808).

March 3, 1806, Essex and Middlesex turnpike from New Brunswick to Newark (Supplement, 1821).

Dec. 13, 1807, Princeton and Kingston Branch of Trenton and New Brunswick turnpike.

Nov. 22, 1808, Woodbridge and New Brunswick turnpike through Piscataway to Bordentown, and from Woodbridge to Rahway.

Nov. 24, 1808, Burlington and New Brunswick turnpike (Supplement, Nov. 10, 1809, and Feb. 6, 1811).

Feb. 16, 1816, Bordentown and South Amboy turnpike (Supplement, Jan. 20, 1817, Nov. 6, 1819, and Dec. 8, 1826).



"when more than four hundred harnessed horses * were seen "standing in front of Withington's inn at once."

Kingston was the half-way point between the two great cities, and about it are clustered many remembrances of the old stage days.

## John Stevens, the Inventor-Statesman.

In the year 1812 there appeared a remarkable pamphlet, written by a remarkable man, to whose foresight, coupled with the genius of his sons, the State of New Jersey owes much of its greatness. I refer to Colonel John Stevens, of Hoboken, and his sons, Robert, Edwin, and John, the projectors and constructors of the Camden and Amboy Railroad. It has seldom been the lot of any one man, I know of none, to leave behind him such a record of usefulness as we find inscribed beneath the medallion portrait of John Stevens, which hangs in the Section of Transportation and Engineering in the United States National Museum at Washington.

The inscription reads:

"John Stevens, of Hoboken, New Jersey,

"Born in New York, of English lineage, 1749; died in Hoboken, N. J., March 6, 1838. Graduate of King's College (now Columbia) A. M., 1768; admitted to the New York bar 1771; treasurer of New Jersey during the active period of the Revolutionary War; and in the succeeding sixty years resided in New York and on his estate in Hoboken.

"Throughout this long period he labored continuously for the introduction and application of steam to navigation and to railroad locomotion.

"It was on his petition that the patent law of 10th April, 1790 — the foundation of the American patent law — was framed (see Journal of House of Representatives, p. 30).

"In 1792 he took out patents for propelling vessels by steam-pumps, modified from the original steam-pumps of

* Gorden's Gazette of N. J., 1834, p. 165.

Savary. He made many experiments on different modes of propulsion by steam, having as his associates the elder Brunel, constructor of the Thames Tunnel, Chancellor Robert L. Livingston, his brother-in-law, and Nicholas J. Roosevelt. In 1798 he constructed a steamboat that navigated the Hudson.

"He made the first practical application of steam to the screw-propeller in 1804; and although the screw-propeller did not come into use until thirty-five years afterwards his engine and screw, which are still preserved, show the correctness of his ideas, as well as the imperfection of the workmanship of that period that prevented commercial success. His short four-bladed screw has survived many forms afterwards tried.

"He patented the multi-tubular boiler in the United States, 1803; in England, 1805; established the first steam ferry in the world, between New York and Hoboken, October 11, 1811, with the 'Juliana.'

"In 1812 (five years before the beginning of the Erie Canal) he addressed a memoir to the New York State Commission, urging the immediate construction of a railroad instead of a canal. This memoir, with the adverse report of the Commissioners (De Witt Clinton, Gouverneur Morris, and Chancellor Livingston), was published at the time, and again with a preface by Charles King, President of Columbia College in 1852. At the date of this memoir, although railroads for carrying coal had been in use in England for upwards of two hundred years, there was not a steam locomotive or passenger car in use in the world. His plans and estimates were definite, and after the introduction of railroads their accuracy was proven.

"In 1815 he received a charter from the State of New Jersey for a railroad to connect New York and Philadelphia — the first railroad charter granted in America; and in 1823, in conjunction with Horace Binney and Stephen Girard, obtained from the State of Pennsylvania a charter for a railroad from Philadelphia to Lancaster, on the line of the present Pennsylvania Railroad.



"In 1826, in the seventy-eighth year of his age, to give an ocular demonstration, he built the first locomotive that ran on a railroad in America. It had a multi-tubular boiler, and carried half a dozen people at a speed of over twelve miles an hour.

"'Born to affluence, his whole life was devoted to experiments, at his own cost, for the common good. He was a thoroughly excited and unwearied experimentor in the application of steam to locomotion on the water, and subsequently on the land. Time has vindicated his claim to the character of a far-seeing, accurate, and skillful practical experimentalist and inventor. The thinker was ahead of his age.'

"CHARLES KING, *President of Columbia College, 1852.*"

Truly a wonderful record of the life work of one man. The pamphlet of 1812 (printed by T. & J. Swords, New York), "Documents Tending to Prove the Superior Advan- "tages of Railways and Steam Carriages Over Canal Naviga- "tion," entitles him, even if he had failed, as he did not, in the field of invention, to be held in grateful remembrance by his countrymen for his broad and statesmanlike views, keen perception, ardent patriotism, and a demonstration that was prophetic in its accuracy.

## THE UNION LINE.

At that time (1812), in connection with his son, Robert, he had made steamboat * navigation on the Delaware a commercial success. Shortly afterward he became connected with the firm that was soon merged into the famous Union Line, which controlled the transportation of merchandise and passengers between Philadelphia and New York for many years. During that time the through route, one hundred and one miles long, between Philadelphia and New York, was divided into three links:

*The machinery of the steamboat "Phœnix," the first steam-driven craft to venture out to sea, which was launched a few days after Fulton's "Clermont," was designed by John Stevens and built by Robert L. Stevens, who accompanied the boat on the first ocean voyage by steam, from Sandy Hook to Cape May, 1808.

| | |
|---|---|
| (1) The steamboat route from Philadelphia to Trenton, | 36 miles. |
| (2) Overland stage and wagon route, Trenton to New Brunswick, over the turnpike, | 25 " |
| (3) Steamboat route, New Brunswick to New York, | 40 " |
| | 101 miles. |

The Trenton and New Brunswick Turnpike Company (chartered in 1804) had made a marked improvement in their road, but these twenty-five miles were a tedious journey to passengers, and expensive to the company in hauling freight by wagon.

### The First Railroad Charter.

Colonel Stevens was anxious to put his recommendations of 1812 into practice. In 1815 he obtained a charter from the State of New Jersey "to build a railroad from the River Delaware, "near Trenton, to the River Raritan, near New Brunswick." This was undoubtedly the earliest railroad charter granted in America; but no tangible result followed, because the scheme was regarded as wild and visionary. The introduction of the steamboat, coupled with the success of the Duke of Bridgewater in the introduction of canals abroad, had made them more popular with capitalists than the untried railroad, and no money could be raised for that undertaking. Colonel Stevens regretted that his financial condition was not such as to warrant him in building the road at his own expense.

### First Charter of the Pennsylvania Railroad.

His interest in the subject of internal communication did not flag on account of this failure, for in 1823, through the exertion of Mr. Stevens, acts were passed by the Legislature of Pennsylvania for the incorporation of a company to construct a railway from Harrisburg to Pittsburgh, and another company to construct a railway from Philadelphia to Columbia, in Lancaster county, among the incorporators being John Stevens, Stephen Girard and Horace Binney.



### John Stevens's Experimental Locomotive.

Three years later (1826) Colonel Stevens, then seventy-six years old, constructed, at his own expense, a locomotive with a multi-tubular boiler, which he operated for several years on a circular track on his estate at Hoboken. A model of this locomotive, together with the original multi-tubular boiler which formed a part of it, is also preserved in our National Museum.

### English Railways in 1825.

Shortly after this the projectors of railroads on this side of the Atlantic became fully acquainted with what had been done in England. In 1825 the Pennsylvania Society for Internal Improvement, with which Mr. Stevens was in close accord, published an elaborate and handsomely-illustrated report showing what had been accomplished by the English engineers. This report was prepared after a personal examination of the English railways by William Strickland, a member of that society, who had been sent abroad for the purpose of investigation.

The facts therein stated, connected with a reasonable success on the Stockton and Darlington Railroad (opened in 1825), strengthened the hopes of those who believed in the ultimate success of the railroad and locomotive in America.

### Need of a Railway Recognized.

While the rivers were open to navigation the Union Line carried passengers and freight by steamboat from New York to New Brunswick; thence by wagon or stage-coach to South Trenton, and thence by Union Line steamboats to Philadelphia. Passengers then left New York at 12 o'clock, noon, and arrived in Philadelphia early next morning.* This was the condition of affairs at the close of the year 1827.

Throughout the State, which lay between the prosperous steamboat lines operated on the Delaware and Raritan, progressive citizens were eagerly watching the railway experi-

* This was done for many years, and until the Camden and Amboy Company was organized. The charges were from 75c. to $1.25 per 100 lbs.

ments abroad, and earnestly hoping for a success that might warrant the importation of the iron horse into America.

### First Public Railroad Meeting.

On the 14th of January, 1828, the first meeting * of citizens

*The following is a true copy of the minutes of the meeting:

At a large and respectable meeting of the citizens of the State of New Jersey, friendly to the proposed railway from Camden to Amboy, convened at the Court-House in Mount Holly on the 14th of January, 28, pursuant to notice, John Black was appointed president, John Dobbins, vice-president, and Charles Stokes and James Newbold were appointed secretaries.

The object of the meeting having been stated to be for the purpose of promoting the above enterprise and adopting suitable measures to insure its success, William Cox, John Beatty, George Haywood, Chalkley Atkinson, Strange N. Palmer, Anthony Sharp and Jeremiah H. Sloan were appointed a committee to draft resolutions expressive of the sense of this meeting on the subject.

The committee reported the followin g resolutions, which were unanimously adopted:

*Resolved*, That, deeply impressed with the importance of internal communication, this meeting conceive that sound policy requires that they should be extended throughout our Atlantic States.

*Resolved*, That, situated as New Jersey is, between the two great emporiums of the Union, and with great resources of her own to sustain the undertaking, it is a reproach to the enterprise of her citizens that a line of internal intercourse has not been extended across her territory.

*Resolved*, That the application to the Legislature for a railway from Camden to Amboy is highly approved by this meeting, and is entitled to their most favorable consideration, whether it be considered with reference to the local interests of our own State or as one of the most important links in the great chain of internal intercourse.

*Resolved*, That this meeting most earnestly recommend to the Legislature the passage of an act incorporating a company with a liberal charter for the construction of a railway from Camden to Amboy.

*Resolved*, That a committee of four persons be appointed to represent the wishes of this meeting to the Legislature, and to take such steps as they shall deem expedient to bring the subject fully and fairly before them.

Whereupon Samuel J. Read, Abraham Brown, Isaac Wilkins and Jeremiah H. Sloan, Esqs., were unanimously appointed to constitute said committee.

It was then, on motion,

*Resolved*, That this meeting do approve the memorial now read, addressed to the Legislature, praying the incorporation of a company for the construction of said railway, and recommend the circulation thereof for signature.

*Resolved*, That John Clement, Benjamin B. Cooper, Samuel Haines, Samuel Ellis and Samuel Lanning, of the County of Gloucester; John Beatty, Clayton Newbold, Anthony S. Earle, Chalkley Atkinson and Joel Hollinshead, of the County of Burlington, be appointed to circulate the said memorial for signatures, and also to appoint such persons in the adjoining counties as they shall deem proper to circulate the same.

*Resolved*, That the thanks of this meeting be given to the president, vice-president and secretaries, and the proceedings thereof be signed by them and published.

Signed by the officers and published in the *New Jersey Mirror*, January 16, 1828.



interested in the construction of a railroad from Camden to South Amboy was held at the Old Court-House at Mount Holly, the county seat of Burlington county.

During 1828 and 1829 meetings were held at Burlington, Bordentown, Princeton, Trenton and other portions of the State in favor of this movement. Numerous petitions and memorials were presented to the Legislature of 1828–29 and 1829–30 praying for the incorporation of a railroad company.

On the 4th day of July, 1828, the corner-stone of the Baltimore and Ohio Railroad was laid at Baltimore, with imposing ceremonies, by the venerable Charles Carroll of Carrollton, the only surviving signer of the Declaration of Independence. At that time two or three short tramways had been laid in the United States from quarries or collieries to adjacent navigable streams: In Delaware county, Pennsylvania, near Leipers to the Delaware river; in Virginia on the James; in Massachusetts near the Neponset; and in Pennsylvania at Mauch Chunk. The Delaware and Hudson Canal Company was then building a railroad from Carbondale to Honesdale, and railroads were projected from Albany to Schenectady in New York, and from Charleston towards Hamburg in South Carolina.

Early in 1829 the Stourbridge Lion,* the first locomotive that ever turned a driving wheel on a railroad built for traffic on the Western Continent, was ordered from England by the Delaware and Hudson Canal Company, arriving here in August, when it made its first trip under Horatio Allen. Later in that year great impetus was given to the construction of railways by Stephenson's success in England with the "Rocket" on the Manchester and Liverpool road.

### Advocates of the Canal Oppose the Railroad.

But there were many who did not believe that a steam railroad could be made to pay in New Jersey. The success of the steamboat routes on both sides of the State, they believed had demonstrated that water-communication was what was needed. Petitions, many and long, were presented to the Legislature

*The original boiler, wheels and a cylinder of this locomotive are preserved in the National Museum at Washington.

of 1828–29 for a canal to connect the Delaware with the Raritan — many of the petitioners desiring that the canal, like the Erie in New York, should be constructed by the State and owned by it.

The owners of the Union Line at an early day espoused the cause of the railroad as against the canal, naturally fearing a loss of business if any rival corporation should build a canal across the State. The Union Line had been uniformly successful in their rivalry with the People' Line and other competitors for the business between New York and Philadelphia. They had thus made many enemies who, as soon as the canal was talked of, gave their allegiance to the new scheme.

When the Legislature of 1829–30 assembled, they found themselves confronted by two influential lobbies, one clamoring for a charter for a canal and another for a railroad. Some idea of the amount of ill-feeling existing at that time may be gathered from the fact that during that winter the prominent friends of both companies thought it necessary to go armed about the streets of Trenton at night — this was the beginning of the active railroad legislation in New Jersey.

## A Compromise Effected.

Upon the reassembling of the Legislature, after the Christmas recess, in January, 1830, the friends of each measure found that both would be defeated unless some conciliatory action was taken. At last a compromise was effected, the details of which were agreed upon by Robert L. Stevens and John C. Stevens, who met Commodore Robert F. Stockton in the lobby of the Park Theatre, New York, between the acts of a play, in the latter part of January, 1830. As the result of the conference one charter was granted to the Camden and Amboy Railroad and Transportation Company, and another charter to the Delaware and Raritan Canal Company on the same day, the 4th of February, 1830.

## Provisions of the Charter.

The capital stock authorized was $1,000,000, divided into shares of $100 each, with the privilege of increasing it to



$1,500,000, "to be employed in the construction of a railroad "or roads, with all the necessary appendages, at some point "between Cooper's and Newton's creeks in the county of "Gloucester, to some point on the Raritan Bay * * * with a "lateral road to Bordentown * * * reserving to the Legisla- "ture the right to subscribe to one-fourth the stock * * * "and pay a transit duty of ten cents for each passenger and "fifteen cents for each ton of merchandise in lieu of all other "taxes." The State reserved the right to purchase the road at the expiration of thirty years at a valuation to be made by law. The act contained the further provision "if the Legis- "lature shall authorize the construction of any other road to "transport passengers from Philadelphia to New York to "terminate within three miles of the commencement or ter- "minus of this road the all transit duties shall cease." *

## Organization: First Officers.

The meeting of the stockholders at which the first organization of the Camden and Amboy Railroad was effected was held at the house of Isaiah Toy, northeast corner Front and Federal streets, Camden, N. J., April 28, 1830. The following persons were chosen the first officers and directors of the company: Robert L. Stevens, of Hoboken, President; Edwin A. Stevens, of Hoboken, Treasurer; Jeremiah H. Sloan, of Camden, Secretary. The above named, together with Abraham Brown, of Mount Holly; William McKnight, of Bordentown; William I. Watson, of Philadelphia; Benjamin Fish, of Trenton, N. J., were chosen Directors. Robert L. Stevens was also appointed Chief Engineer.

## Early Railroad Surveys.

The early surveys † of the Camden and Amboy Railroad

* This act was amended in Feb., '31, and in March, '32, making the protection more absolute. The Act of March 15, '32, stated "That it "shall not be lawful at any time during the charter to construct any "other railroad in the State without the consent of the companies, which "shall be intended or used for the transportation of passengers or mer- "chandise between the cities of New York and Philadelphia."

† The following are *verbatim* extracts from Major Wilson's report of October 11, 1830, to the Board of Directors of the Camden and Amboy Railroad Company:

Company were made under the direction of Major John Wilson, a graduate of West Point Military Academy, and were begun in the spring of 1830 and completed on October 2, in that year, being hastened by the course taken by the canal company, who also made surveys for a railroad along the canal bank. Lieutenant William Cook and John Edgar Thomson, afterwards president of the Pennsylvania Railroad, had direct charge of the surveying parties, the former having charge of the section from South Amboy to (Crosswicks Creek, near) Bordentown, and the other from that point to Camden. The surveys were made so that as large a proportion of the distance between New York and Philadelphia as possible would be a water route, it being the belief in those days that traveling by steamboat would always be more popular and more economical than traveling overland, and that railroads would only be subsidiary to the water routes. And this idea was adhered to for years, for even after the railroad was opened from Camden to Bordentown, the steamboats remained on the river to carry passengers and freight between these points.

The books of the company show that the first charge made to grading was for work done at Bordentown on December 4, 1830, the amount expended for grading during 1831 being $100,898.39. The first horse bought was purchased June 20, 1831. The first bill of lumber was paid to Benjamin Fish July 26, 1831, and Robert L. Stevens, first president of the company, drew his first year's salary, $6,000, November 26, 1831.

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Grades: "Assuming the velocity of a locomotive engine on an inclination of 30 feet per mile at 10 miles per hour, the comparative velocity "in traveling with the same weight on an inclination of 35 feet per mile "will be as the difference between the space of $\frac{1066}{10000}$ and $\frac{1536}{10000}$ of a mile "per minute passed over. While, therefore, the engine has passed over "1 mile on an inclination of 30 feet, it would have traveled 1 mile, 6 "chains and 72 links on an inclination of 30 feet; and in case of 40 feet "graduation the difference would be 13 chains, 45 links." Of curves he says: "As carriages are kept on the rails by flanges on the wheels, it is "obvious that where there is on any portion of the line an excess of "curvation, the friction from the rubbing on the sides of the rails, and "consequent retardation, must be very great." Several routes as laid down on the map were surveyed before he determined upon the one which was adopted. The estimate for grading 61⅓ miles of road was $276,212.



## Inception of the Delaware and Raritan Canal.

The construction of a canal between the Delaware and Raritan rivers had been under contemplation for many years.

The first act of legislation relating thereto will be found in the charter granted in the year 1804 to William Patterson and others, "for the purpose of opening a communication by "water from the river Raritan at or near New Brunswick to "the tidewater of the river Delaware at or near Lamberton." But the importance and necessity of a canal across New Jersey had been made more apparent by the difficulties which attended the transportation of military stores and other property during the war of 1812, and a route was surveyed in the year of 1816, under the auspices of Thomas P. Johnson, Esq., of Princeton, from the Delaware to the Raritan, by the way of the Heathcote and Lawrence brooks.

In the year of 1823 George Holcombe (who was also one of the Commissioners in 1816), L. Q. C. Elmer and Peter Kean were appointed commissioners by the State of New Jersey "for the purpose of ascertaining the practicability of the canal "to unite the waters of the Delaware and Raritan rivers, "* * * and to report to the Legislature the probable "expense, and revenue to be derived therefrom."

These Commissioners recommended that the State should undertake the work and pointed out the mode by which the means were to be raised. Their recommendations were referred to a committee of the Legislature who made a full report in favor of their approval, "if the benefit expected may be "realized to the State without assuming the great responsi- "bility which must be incurred by its undertaking the "expense and future risk of the canal and its management as "a State property, and advocating the incorporation of a "private company, by a charter that will secure to the State "by subscriptions to the stock or other means a reasonable "part and interest in the profits, and direction of the said "company."

## The Act of Incorporation of 1826.

The committee also reported a bill incorporating this idea, which was passed by the Legislature, by a vote of thirty-one to eleven in the Assembly and nine to four in the Council, on the 30th of December, 1826. By this act of incorporation, authority was granted to a company to construct a canal from the Delaware to the Raritan river.

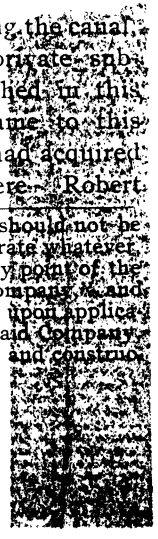
The act contained a provision * of the most effective protection against canal and railroad competition, and corresponded in this respect with the protection of ten miles secured to the Morris Canal against any rival works.

These were among the first acts passed by the State of New Jersey in reference to canal and railways in which the principle of protection, or as it was afterwards termed "monopoly," was incorporated. But this practice in regard to bridges and other public works was old.

## State Aid Refused.

As the people before whom the subject was discussed, and by whom it was thoroughly understood, had decided, through their representatives in the Legislature, that the internal improvements of New Jersey, if made at all, were to be made by private corporators, no capitalist, without protection, could be induced to risk his money in such stupendous works without any definite prospect of remuneration. For that reason these special privileges were offered.

The State having refused even to assist in building the canal, an attempt was made to raise the funds by private subscription. It is related that this was accomplished in this way: John Potter, a Scotch-Irishman, who came to this country in 1818 and settled in Charleston, S. C., had acquired considerable wealth through his speculations there. Robert



* By the seventeenth section, it was provided that "it should not be "lawful for any person or persons, body politic or corporate whatever, "to construct any canal or railway within ten miles of any point of the "said canal or feeder without the consent of the said company, and "that it shall be the duty of the Chancellor of the State, upon applica- "tion made therefor by bill in due form of law by the said Company, "to issue his injunction to stay and prevent the erection and construc- "tion of any such canal and railway."



F. Stockton, an officer of the United States Navy (afterwards commodore), from Princeton, N. J., having been detailed to make a survey of the southern waters in 1823, met and married Maria Potter, daughter of the above-named gentleman, and located, with his family, in Princeton in 1826. As the canal was expected to pass through Princeton, he was naturally interested in the project and became identified with its projectors at an early day. When the funds for its construction were not forthcoming he induced his father-in-law, John Potter, who had over half a million dollars in the United States Bank, to withdraw his funds from that institution to insure the construction of the canal. This Mr. Potter subsequently did, and it resulted fortunately for him, as the United States Bank collapsed a short time afterwards.

## Terms of the Canal Charter.

By the charter of the Delaware and Raritan Canal, passed February 4, 1830, the capital authorized was $1,000,000, with the privilege of increasing it to $1,500,000, divided into shares of $100 each.

The canal was to be fifty feet wide at water-line, five feet deep, and the feeder thirty feet wide and four feet deep.

The canal company was authorized to charge five cents per ton per mile, and no other canal was to be built within five miles of any point on the canal or feeder. According to the charter the State was to receive a transit duty of eight cents on each passenger and eight cents on each ton of freight transported through the canal (except coal, lumber, ashes and such low-priced articles, which were to pay only two cents per ton), and the State had the right to purchase the canal at a fair appraisement thirty years after its completion.

On February 3, 1831, this time was extended to fifty years, in consideration of the fact that the canal should be made seventy-five feet wide, seven feet deep and the locks one hundred feet long and twenty-four feet wide, and after the passage of the Marriage act (February 15, 1831), it enjoyed, of course, the same privileges of protection as the Camden and Amboy Railroad Company.

The commissioners appointed by the State to attend to the subscription of stock in the canal company met at Mount Holly, February 23, 1830—James Parker, James Neilson, John Potter, William Halstead and Garrett D. Wall being present. They decided to open the subscription books as follows:

Mar. 23, 1830, at the house of William Herbert, Trenton.
" 24, 1830, " " " " John Joline, Princeton.
" 25, 1830, " " " " George Follett, New Brunswick.

This arrangement was carried out, and John Potter became the largest stockholder.

## Organization and First Officers.

The first meeting of stockholders was held at the house of William Herbert, in Trenton, on the 10th day of May, 1830, who organized by the selection of directors and officers, as follows:

Robert F. Stockton, of Princeton, president; John R. Thomson, of Princeton, secretary; James Neilson, of New Brunswick, treasurer; the remaining directors being James Parker, of Perth Amboy; William Halstead, of Trenton; Garrett D. Wall, of Burlington; Joseph McIlvaine, of Burlington; James S. Green, of Princeton.

The work was commenced at once, Canvass White, who had acquired distinction by his connection with the Erie Canal, being the chief engineer, assisted by J. Humstead, Ashbel Welch and Edwin Douglas.*

The summer of 1830 was occupied in making the surveys.

## Railway Surveys Made by the Canal Engineers.

The desire of the canal company to construct a railroad was so great, that surveys for a railroad over the same route were made at the same time. At the meeting of the board of directors, October 1, 1830, a resolution was adopted to the effect that it was "expedient to build a direct railroad from the "Raritan to the mouth of the Heathcote brook, thence along

* Inventor of the inclined canal plane.



"the canal lines to the Delaware river at Tullytown, *provided* "the necessary powers and privileges can be obtained."

October 25, 1830, the board met to receive the report of Canvass White which, after alluding to the advantages of the proposed route for the canal, states: "Although the country "appeared unfavorable for a canal, it is very favorable for a "railroad from near Kingston to the Raritan—surveys were "made and a line located which can in a few days be prepared "for grading."

## Estimates of Cost of Canal.

Mr. White's estimates were as follows:

| | |
|---|---|
| Navigable feeder, | $305,168 |
| Main canal, | 738,937 |
| Damages, &c., | 68,400 |
| Add for contingency, | 55,625 |
| | $1,168,130 |

Thirty-eight and a half miles:

| | |
|---|---|
| Estimated cost of railroad, per mile, $6140 = | $221,040 |
| Add for contingency, 5 per cent., | 11,052 |
| | $232,092 |
| To which must be added the cost of crossing the Delaware, estimated at* | $35,000 |

At the same meeting a committee, consisting of Robert F. Stockton, James Neilson, William Halstead, James Parker and Garrett D. Wall, were appointed to present a memorial to the Legislature at the next meeting, asking for railroad privileges and the extension of the time when the State shall be authorized to purchase the canal from thirty to sixty years.

## The Marriage Act.

After the charters were granted, both to the canal and railroad, it was found that the necessary amount of capital to con-

* The estimate for grading the 61⅓ miles of railroad from Camden to South Amboy was $276,212.01.

struct the canal could not be raised as rapidly as was expected, since capitalists refused to invest their money in canal shares in view of the fact that a railroad was being built to connect Philadelphia and New York.

The projectors of the canal were greatly alarmed. It looked as if John Stevens's recommendations of 1812 would be followed, and that the canal would not be built, owing to a lack of funds. Early in the session of 1830–1831, Commodore Stockton, and others of the committee appointed October 25, 1830, applied to the Legislature for the right to construct the railroad on the canal bank. A short portion of track had already been laid. The managers of each company saw that the carrying out of such a course would be fatal to the stockholders, both of the canal and the railroad, and a compromise was effected, and what was called "The Marriage Act" was passed February 15, 1831.

The act also provided that "the canal and railroad should "be completed within the time specified in their respective "charters, and if one of the works at the expiration of such "time be completed without the other, then the work com-"pleted shall be forfeited to the State."

The companies united by this act combined their stock at the same valuation, but elected separate officers and directors and kept their accounts entirely separate and distinct. The boards elected a joint president and secretary to preside over the meetings of the joint boards.

No other agreement of a character similar to this has been made, so far as is known, in this or any country.

Thus the famous "Joint Companies" came into existence.



## THE STEVENS RAIL AND SPIKE.

Early in October, 1830, and shortly after the surveys of the Camden and Amboy Railroad were completed, Robert L. Stevens (born 1787) sailed for England, with instructions to order a locomotive and rails for that road.

At that time no rolling mill in America was able to take a contract for rolling T rails.

Robert Stevens advocated the use of an all-iron rail in preference to the wooden rail or stone stringer plated with strap iron, then in use on one or two short American railroads. At his suggestion, at the last meeting held before he sailed, after due discussion, the board of directors of the Camden and Amboy Railroad passed a special resolution authorizing him to obtain the rails he advocated.

### Robert L. Stevens Invents the American Rail and Spike.

During the voyage to Liverpool he whiled away the hours on shipboard by whittling thin wood into shapes of imaginary cross-sections until he finally decided which one was best suited to the needs of the new road.

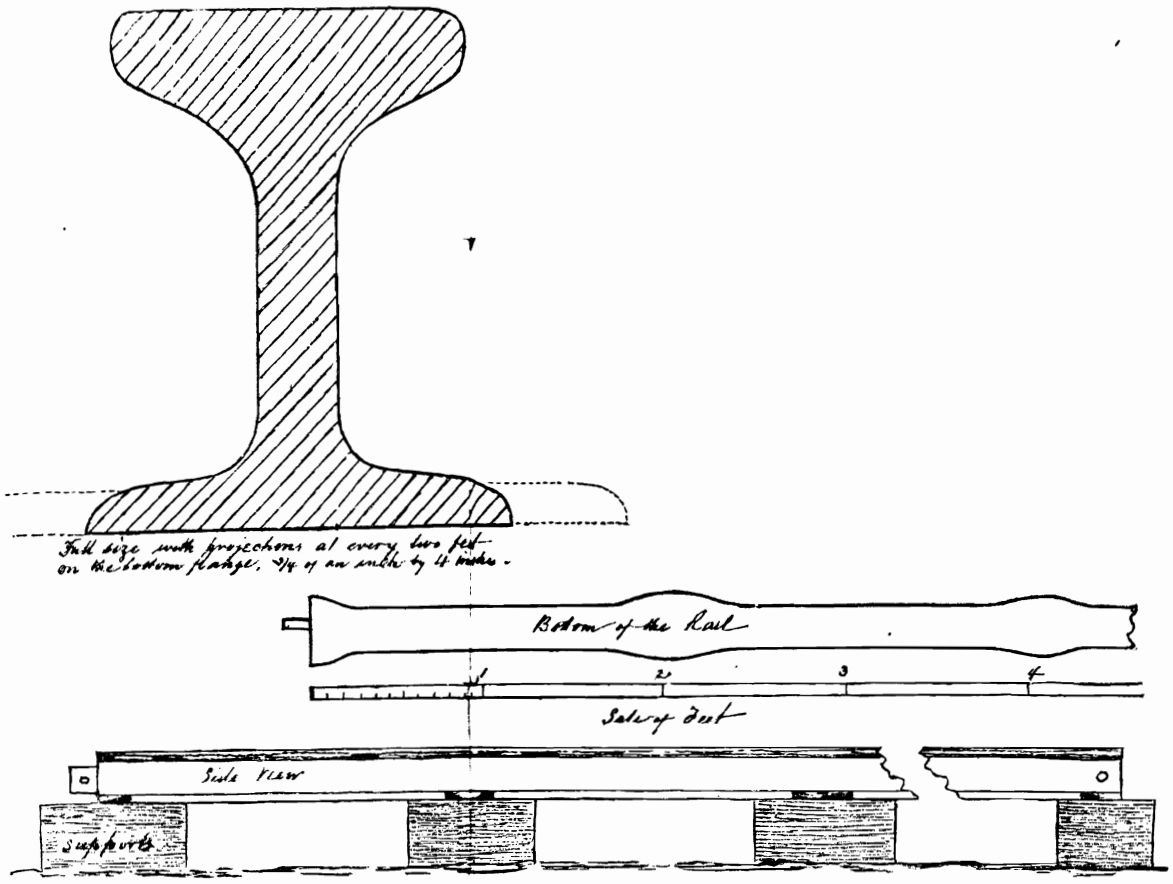
He was familiar with the Berkenshaw rail, with which the best English roads were then being laid, but he saw that, as it required an expensive chair to hold it in place, it was not adapted to our country, where metal workers were scarce and iron was dear. He added the base to the T rail, dispensing with the chair. He also designed the "hook-headed" spike (which is substantially the railroad spike of to-day) and the "iron tongue" (which has been developed into the fish-bar), and the rivets (which have been replaced by the bolt and nut) to complete the joint.

A fac-simile of the letter,* which he addressed to the English

* This letter reads:

Liverpool, *November 26th, 1830.*

"Gentlemen,—At what rate will you contract to deliver at Liverpool, say from 500 to 600 tons of railway, of the best quality of iron rolled to the above pattern in 12 or 16 feet lengths, to lap as shown in




Liverpool November 26 1830.

Gentlemen

At what rate will you contract to deliver at Liverpool; say from five to six hundred tons of Railway of the best quality Iron rolled to the above pattern in twelve or fourteen feet lengths, to lap as shewn in the drawing, with one hole at each end, and the projections on the lower flange at every two feet. Cash on delivery. How soon could you make the first delivery, and at what rate p month until the whole is complete. Should the terms and the work give satisfactory a more extended order is likely to follow, as this is but about one sixth part of the quantity required. Please to address your answer (as soon as convenient) to the care of Francis B Ogden, Consul of the United States at Liverpool.

I am

Your obedient Servant

Robt L Stevens

President & Engineer of the Camden & South Amboy Rail road & transportation Company

iron masters a short time after his arrival in London, is preserved in the U. S. National Museum. It contains a cross-section, side elevation and ground plan of the rail, for which he requested bids. (See plate.)

The base of the rail which he first proposed was to be wider where it was to be attached to the supports than in the intervening spaces. This was afterwards modified, so that the base was made the same width (three inches) throughout.

## Difficulty of Rolling the American Rail.

Mr. Stevens received no favorable answer to his proposals, but being acquainted with Mr. Guest (afterwards Sir John Guest) a member of Parliament, proprietor of large iron works in Dowlais, Wales, he prevailed upon him to have rails rolled at his works. Mr. Guest became interested in the matter and accompanied Mr. Stevens to Wales, where the latter gave his personal supervision to the construction of the rolls. After the rolls were completed the Messrs. Guest hesitated to have them used, through fear of damage to the mill machinery, upon hearing which Mr. Stevens deposited a handsome sum guaranteeing the expense of repairing the mill in case it was damaged. The receipt for this deposit was preserved for many years among the archives of the Camden and Amboy Company. As a matter of fact, the rolling apparatus did break down several times. "At first," as Mr. Stevens in a letter to his father, which I have seen, described it, "the rails came from the rolls twisted and as crooked as snakes," and he was greatly discouraged. At last, however, the mill men acquired the art of straightening the rail while it cooled.

the drawing, with one hole at each end, and the projections on the lower flange at every two feet, cash on delivery?

"How soon could you make the first delivery, and at what rate per month until the whole is complete? Should the terms suit and the work give satisfaction a more extended order is likely to follow, as this is but about one-sixth part of the quantity required. Please to address your answer (as soon as convenient) to the care of Francis B. Ogden, Consul of the United States at Liverpool.

I am

Your obedient servant,

ROBERT L. STEVENS,

*President and Engineer of the Camden and South Amboy Railroad and Transportation Company.*"



The first shipment,* consisting of five hundred and fifty bars eighteen feet long, thirty-six pounds to the yard, arrived in Philadelphia on the ship Charlemange May 16, 1831.

Over thirty miles of this rail was laid before the summer of 1832.

A few years after, on much of the Stevens rail laid on the Camden and Amboy Railroad, the rivets at the joints were discarded, and the bolt with the screw-thread and nut, similar to that now used, was adopted as the standard.

The rail was first designed to weigh thirty-six pounds per yard, but it was almost immediately increased in weight to between forty and forty-two pounds, and rolled in lengths of sixteen feet. It was then three and a-half inches high, two and one-eighth inches wide on the head and three and a-half inches wide at the base, the price paid in England being £8 per ton. The import duty was $1.85.

The first shipment of rail, having arrived in America, was transported to Bordentown, and here, upon the ground on

* A list of the vessels chartered to transport the rails, with dates, tonnage, &c., is given below:

| Date. | Ship. | No. of Bars. | Tonnage. tons. | cwt. | lbs. | Rate of Duty. |
|---|---|---|---|---|---|---|
| May 16, 1831. | Charlemagne, | 550 | 504 | 0 | 14 | $1.85 |
| May 19, 1831. | Salem, | 963 | 774 | 2 | 14 | 1.85 |
| April 7, 1832. | Caledonia, | 38 | 73 | 3 | 07 | 1.85 |
| April 23, 1832. | Armadilla, | 525 | 1,000 | 3 | 21 | 1.85 |
| May 4, 1832. | George Clinton, | 624 | 986 | 2 | 14 | 1.85 |
| June 2–18, 1832. | Henry Kneeland, | 204 | 377 | 3 | 21 | 1.85 |
| May 8, 1832. | Cumberland, | 1,464 | 2,790 | 1 | 00 | 1.85 |
| June 2, 1832. | Gardiner, | 601 | 1,136 | 0 | 00 | 1.85 |
| June 5, 1832. | Globe, | 499 | 943 | 1 | 14 | 1.85 |
| June 6, 1832. | Jubilee, | 70 | 130 | 0 | 21 | 1.85 |
| July 18, 1832. | Hellen, | 1,080 | 2,004 | 3 | 21 | 1.85 |
| July 19, 1832. | Nimrod, | 937 | 1,745 | 3 | 00 | 1.85 |
| Aug. 2, 1832. | Emery, | 240 | 454 | 2 | 00 | 1.85 |
| Aug. 6, 1833. | Ajax, | 364 | 700 | 0 | 21 | 1.85 |
| Aug. 13, 1832. | Concordia, | 622 | 1,174 | 3 | 14 | 1.85 |
| Aug. 14, 1830. | William Byrny, | 1,120 | 2,138 | 1 | 07 | 1.85 |
| Aug. 20, 1832. | Mary Howland, | 932 | 1,755 | 3 | 07 | 1.85 |
| Aug. 23, 1832. | Pulaski, | 488 | 924 | 1 | 00 | 1.85 |
| Aug. 24, 1832. | Robert Morris, | 1,985 | 3,732 | 0 | 14 | 1.85 |
| Aug. 27, 1832. | Ann, | 506 | 961 | 2 | 07 | 1.85 |
| Sept. 3, 1832. | Montgomery, | 1,369 | 2,959 | 0 | 14 | 1.85 |
| Sept. 4, 1832. | Marengo, | 534 | 1,004 | 2 | 07 | 1.85 |
| Oct. 12, 1832. | Vestal, | 237 | 460 | 2 | 07 | 1.85 |

This iron proved to be of such superior quality, that after it was worn out in the track the company's mechanics preferred it to new iron in making repairs. Some of this rail is still in use in side tracks. It is pronounced equal in durability to much of the steel rail of to-day.

which we stand, and which this monument is erected to mark forever, was laid the first piece of track (about five-sixths of a mile long) in August, 1831. The Camden and Amboy Company, following the example of the Manchester and Liverpool Railroad, laid their first track upon stone blocks two feet square and ten to thirteen inches deep. These blocks were purchased from the prison authorities at Sing Sing, N. Y. Some of these stone blocks have been used in constructing the foundation for this monument.

### First Joint Fixtures.

Mr. Stevens ordered the first joint fixtures, also from an English mill, at the same time. The ends of the rails were designed to rest upon wrought-iron plates or flat-cast plates. The rails were connected at the stems by an iron "tongue" five inches long, two inches wide and five-eighths of an inch thick. A rivet, put on hot, passing through the stem of each rail near the ends of the bar, fastened it to the tongue and completed the joint. A hole oblong in shape, to allow for expunctral contraction, was punched in the stem at each end of the rail.

### The First Railroad Spikes.

The first "spikes six inches long, with hooked heads," were also ordered at the same time. These were undoubtedly the "first railroad spikes" (as they are known to the trade) ever manufactured.

Mr. Stevens neglected to obtain a patent for these inventions, although urged to do so by Mr. Ogden, American Consul at Liverpool, and the credit of being the inventor of the American Rail was for a time claimed for others, but the evidence brought forward in late years fully established the fact that he was the originator of the American system of railway construction.

The "Stevens rail and spike" gradually found great favor everywhere in America—all the roads being relaid with it as the original T or strap rail became worn out.

In England the T rail still continues to be used. The London and Birmingham Railway, opened in 1838, was laid



with Birkenshaw rails; part with the straight and part with the fish-bellied rail and the remainder with reversible "bull-headed" rail, both types being supported by chairs.*

Sixty years have elapsed since this rail was adopted by the Camden and Amboy Company, and with the exception of slight alterations in the proportions incident to increased weight, no radical change has been made in the "Stevens rail," which is now in use on every railroad in America. Many improvements have been made in the joint fixture but the "tongue" or fish plate improved into the angle splice bar is in general use, and nothing has yet been found to take the place of the "hook-headed" railroad spike which Robert Stevens then designed.

The track upon which we stand was the first in the world that was laid with the rail and spike now in general use.

### Mr. Stevens Examines English Locomotives.

Mr. Stevens divided his time while abroad between arranging for the manufacture of track material and examining the English locomotives that were being constructed or had been in service.

A year had elapsed since the opening of the Liverpool and Manchester Railway, and the English mechanics had not been idle. The "Rocket," although successful in the Rainhill contest, when put to work had shown many defects that Stephenson & Co. were striving to correct in subsequent locomotives.

The "Planet," built by that firm, was first tried in public December 4, 1830, shortly after Mr. Stevens arrived in England, and at that time was undoubtedly the best locomotive in the world.

### The "John Bull" Ordered.

Mr. Stevens was present at a trial when the "Planet" showed most satisfactory properties, and he at once ordered a locomotive of similar construction, from the same manufacturers

* The experiment of laying the Stevens rail in chairs was tried on the Albany and Schenectady road in 1837, on the Hudson River Railroad, 1848, but the chairs were soon afterwards discarded, nothing but spikes being used to attach the rail to the tie.

for the Camden and Amboy Railroad. This engine, afterward called the "John Bull" and "No. 1," was completed in May and shipped by sailing vessel from New Castle-on-Tyne in June, 1831, arriving in Philadelphia about the middle of August of that year. It was then transferred to a sloop at Chestnut-street wharf, Philadelphia, whence it was taken to Bordentown.

### The "John Bull" Arrives at Bordentown.

The following circumstances connected with the arrival of the engine at Bordentown, N. J., are related by Isaac Dripps, Esq., for many years master mechanic of the Camden and Amboy Railroad, and afterwards superintendent of motive power of the Pennsylvania Railroad, who is now, after a busy life, enjoying a peaceable retirement at his pleasant home in West Philadelphia.

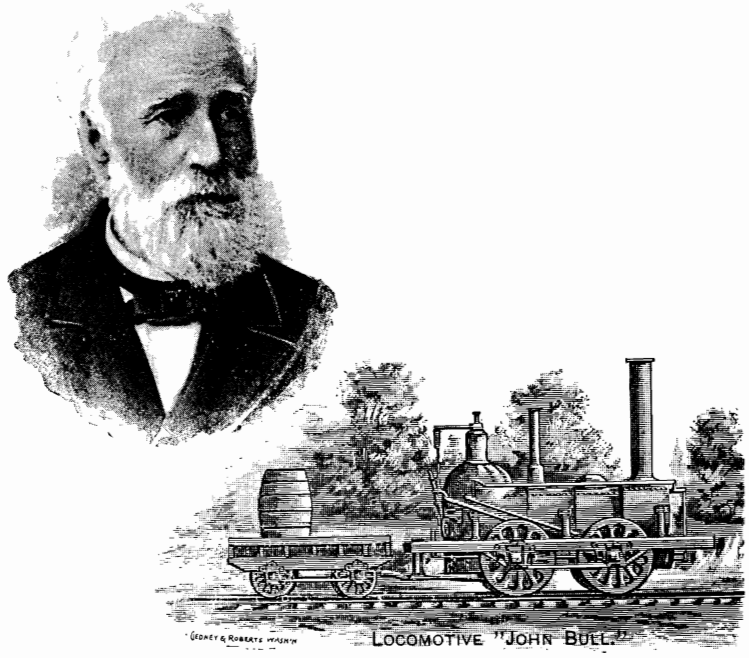
Mr. Dripps, who is now in the eighty-second year of his age, was employed by Robert and Edwin Stevens in repairing and assisting with their steamboats on the Delaware river and at Hoboken as early as 1829. When the "John Bull" arrived in Philadelphia he was detailed by Robert Stevens to attend to the transportation of the engine to Bordentown, where it was landed safely the last week in August, 1831.

The boiler and cylinders were in place, but the loose parts — rods, pistons, valves, etc. — were packed in boxes. No drawings nor directions for putting the engine together had come to hand, and young Dripps, who had never seen a locomotive, found great difficulty in discovering how to put the parts in place, alone and unassisted, as Robert Stevens, who had returned from Europe, was absent at Hoboken at the time attending to other matters.

### Dimensions of Engine and Parts.

The bronze bas-relief upon the monument, made from the working drawing furnished by Mr. Dripps, is an exact representation of the locomotive when it arrived in America.

The engine originally weighed about ten tons. The boiler was thirteen feet long and three feet six inches in diameter.




ISAAC DRIPPS,
First Master Mechanic of the Camden and Amboy Railroad.

The cylinders were nine inches by twenty inches. There were four driving wheels four feet six inches in diameter, arranged with outside cranks for connecting parallel rods, but owing to the sharp curves on the road these rods were never used. The driving wheels were made with cast-iron hubs and wooden (locust) spokes and felloes. The tires were of wrought iron, three-quarters of an inch thick, the tread being five inches and the depth of flange one and a-half inches. The gauge was originally five feet from center to center of rails. The boiler was composed of sixty-two flues seven feet six inches long, two inches in diameter; the furnace was three feet seven inches long and three feet two inches high, for burning wood. The steam ports were one and one-eighth inches by six and a-half inches; the exhaust ports one and one-eighth by six and a-half inches; grate surface, ten feet eight inches; fire-box surface, thirty-six feet; flue surface, two hundred and thirteen feet; weight, without fuel or water, twenty-two thousand four hundred and twenty-five pounds.

After the valves were in gear and the engine in motion, two levers on the engineman's side moved back and forth continuously. When it was necessary to put the locomotive on the turntable, enginemen who were skilled in the handling of the engines first put the valves out of gear by turning the handle down, and then worked the levers by hand, thus moving the valves to the proper position and stopping the engine at the exact point desired.

The reversing gear was a very complicated affair. The two eccentrics were secured to a sleeve or barrel, which fitted loosely on the crank-shaft, between the two cranks, so as to turn freely. A treadle was used to change the position of this loose eccentric sleeve on the shaft of the driving wheel (moving it to the right or left) when it was necessary to reverse. Two carriers were secured firmly to the body of this shaft (one on each side of the eccentrics); one carrier worked the engine ahead, the other back. The small handle on the right side of the boiler was used to lift the eccentric-rod (which passed forward to the rock shaft on the forward part of the engine) off the pin, and thus put the valves out of gear before it was possible to shift the sleeve and reverse the engine.

Great similarity will be noticed in the American locomotives built for many years after the arrival of the "John Bull," especially in the matter of making the keys, brasses, etc., on the connecting-rods, and in the construction of valves, fire-box and tubes. Even the old plan of setting the ends of the exhaust-nozzle high up in the smoke-box, which was discontinued when the petticoat pipe came in use, is now again resorted to in connection with the extended smoke-box of modern locomotives.

### First Trial of the Locomotive.

Mr. Dripps informs me that, after many attempts, he succeeded in putting the parts of the engine together, and when it was placed in position upon the track he notified Robert Stevens of the fact. Mr. Stevens came at once to Bordentown, as his anxiety to see it in operation was very great. Upon his arrival the boiler was pumped full of water, by hand, from the hogshead in which it was brought. Benjamin Higgins made the fire with pine wood, and when the scale * showed thirty pounds steam pressure, Isaac Dripps opened the throttle, Robert Stevens standing by his side, and the first locomotive on this great highway *moved*. It would be difficult to describe the feeling of these three men as they stood upon the moving engine — the first human freight drawn by steam on what was afterwards destined to be the great highway connecting the two most populous cities of the American Continent; a most important link in the chain of intercommunication between the North and South and West. What possibilities must have dawned upon them if they cared to lift the veil of the future!

During the next few days after this preliminary trial the engine was again taken apart, and as a few of the parts needed modification some time intervened before it was again in running order. It will be remembered that young Dripps had never seen a locomotive before, and there were no "old engineers" to consult in regard to the construction or management of the engine.

* The dial gauge was not in use at that time.



### A Tender Improvised.

As no tender came with the locomotive, one was improvised from a four-wheel flat car that had been used on construction work, which was soon equipped to carry water and wood. The water tank consisted of a large whiskey cask which was procured from a Bordentown storekeeper, and this was securely fastened on the center of this four-wheeled car. A hole was bored up through the car into the barrel and into it a piece of two-inch tin pipe was fastened, projecting below the platform of the car. It now became necessary to devise some plan to get the water from the tank to the pump and into the boiler around the turns under the cars, and as a series of rigid sections of pipe was not practicable, young Dripps procured four sections of hose two feet long, which he had made out of shoe leather by a Bordentown shoemaker. These were attached to the pipes and securely fastened by bands of waxed thread. The hogshead was filled with water, a supply of wood for fuel was obtained, and the engine and tender were ready for work.

### Steam or Horse Power?

At that time the question whether the railroad should be operated by steam locomotives or horse power had already become a political issue. The farmers and other horse owners and dealers, who had made money by selling hay and grain and horses to the stage and freight-wagon lines, were discussing the possibilities of loss of business.

### Trial of the Engine Before the Legislature.

Many of the members of the New Jersey Legislature were farmers. The management of the Camden and Amboy Railroad was anxious to give these gentlemen and other prominent citizens an opportunity to examine a steam locomotive at work and to ride in a railway train.

Sixty years ago to-day, on the 12th of November, 1831, by special invitation, the members of the Legislature and other State officials were driven from Trenton to Bordentown in stages to witness the trial. Among them were John P. Jackson (father of the present general superintendent of the United

Railroads of New Jersey division of the Pennsylvania Railroad, who afterwards took a prominent part in the affairs of the New Jersey Railroad, whose termini were at New Brunswick and Jersey City); Benjamin Fish (director for fifty years for the Camden and Amboy Railroad), afterwards president of the Freehold and Jamesburg Agricultural Railroad; Ashbel Welch, chief engineer and superintendent of the Belvidere and Delaware Railroad for many years, and president of the United Railroads of New Jersey during the years immediately preceding the lease to the Pennsylvania Railroad; Edwin A. and Robert L. Stevens, afterwards managers of the road.

## First Cars.

Two coaches built so that they might be drawn by horses were attached to the locomotive. These coaches were of the English pattern. They had four wheels and resembled three carriage bodies joined together, with seats in each facing each other. There were three doors at each side. These cars were made by a firm of carriage manufacturers, M. P. and M. E. Green, of Hoboken, and were thought to be very handsome. The New Jersey law-makers were somewhat dubious, it is said, about risking their lives in this novel train, but at last they concluded to do so and the train started and made many trips back and forth without accident or delay. Madam Murat, wife of Prince Murat, a nephew of Napoleon Bonaparte, who was then living in Bordentown, insisted on being the first woman to ride on a train hauled by a steam locomotive in the State.

In the evening a grand entertainment was given to the Legislature by the railroad company at Arnell's Hotel, Bordentown, and it has been whispered that the festivities kept up until a late hour in the night. Whether that be true or not, it is generally conceded that from that time to this the Legislature of New Jersey have always been more or less interested in the affairs of the Camden and Amboy Railroad and its successors, or *vice versa*.

This first movement of passengers by steam in the State of New Jersey was regarded as a success from every point of



view, and in commemoration of the important events here enacted the boundaries of this first piece of railway laid between New York and Philadelphia, which were identified and staked out by Isaac Dripps a half century afterwards, have been definitely marked for all time by the Pennsylvania Railroad Company, who have erected these handsome stones.

## Early Difficulties.

Among the earliest troubles of the young engineer and his employer, Robert L. Stevens, was the fact that as there were only four wheels under the engines they were derailed frequently in going around curves, so it was necessary to provide an appliance to prevent this.

## The First Pilot.

The first pilot was planned, 1832, by Robert L. Stevens. A frame made of oak, eight by four feet, pinned together at the corners was made: Under one end of it a pair of wheels twenty-six inches in diameter were placed in boxes, and the other end was fastened to an extension of the axle, outside of the forward driving wheels, it having been found by experience that a play of about one inch on each side on the pedestals of the front wheels of the pilot or engine was necessary in order to get around the curves then in the tracks. For years afterwards there was very little change in constructing the pilots from that originally applied to the "John Bull."

The spiral spring, which held the front wheels of the pilot in place, acted substantially as the center pin of a truck. The turntables in use on the road were so short that it was necessary to unconnect and take off these pilots before turning the engine. After the pilot was adopted the forward large wheel on right of the engine was made loose on the shaft in order to afford additional play in going around curves. Other * changes and additions were also made in the locomotive.

* Changes in the locomotive "John Bull" since date of construction, 1830:

Steam dome changed from rear of boiler, forward to a part over what was called the "man-hole," and throttle-valve placed therein.

Steam-pipes changed to outside of boiler, connecting new dome with smoke-box, entering it on each side.

## Improvements in Locomotive Building.

During 1831–35 the company's shops were located at Hoboken, N. J., and during the winter of 1832–33, three locomotives were commenced at these shops (two completed before March, 1833, the other in April), the valves, cylinders, pistons, etc., coming from England, the boilers being made under the direction of Robert L. Stevens. It was his opinion that the "John Bull" was too heavy and the new boilers were built smaller and lighter, so that the engines, when completed, weighed eight instead of ten tons. With these three engines, which were delivered to the railroad company at South Amboy, the stone blocks and other material for the permanent track was delivered along the line of the road.

## Baldwin's First Locomotives.

The importation of the locomotive "John Bull" was destined to have a far-reaching influence in moulding the types of early American locomotives.

After the demonstration of November 12, 1831, the engine was taken from the track and stored in a shed constructed to protect it until such time as the track should be completed.

It was about this time that the proprietor of Peales' Museum, in Philadelphia, applied to Matthias Baldwin, an ingenious

In the beginning the reverse gear was changed from one single eccentric rod on each side to two on each side, connecting on to the same eccentric wheel, and the lifting rod, in pulling back, lifted the forward gear-hook off the rocker-arm, and the back-motion hook then connecting on the rocker-arm reversed the engine.

Side rods were never used.

Driver spring was changed from a bearing under the pedestal boxes to a point over the boxes.

The pilot was attached in this manner:

Right forward wheel being loose, forward axle extended eight inches beyond box on each side; to this was attached the beam of the pilot, having play of about 1 inch between box and pedestal-plate to act while going around curves. The weight of forward part of engine rested upon a cross-brace of the two-wheel pilot, which took bearing by a screw-pin surrounded by a spring, by turning which pin the weight on the drivers could be adjusted.

A brace used as a hand-rail was added on top of the frame, bracing frame and acting as a guide to the driving springs.

Water-cocks changed from right to left side of boiler.

Bell, whistle and headlight were added.

Balance safety-valve scale was changed forward to a point over barrel of boiler, the secret valve being over the new dome.



mathematical instrument maker, for a small locomotive to run upon a circular track on the floor of the museum. Mr. Baldwin had heard of this locomotive. He came to Bordentown and applied to Isaac Dripps for permission to inspect it. Mr. Dripps tells me he remembers very well the day that he explained to Mr. Baldwin the construction of the various working parts.

Mr. Baldwin built a toy engine for Mr. Peale, which was so successful, that in 1832 he was called upon by the Philadelphia and Germantown Railroad Company to construct the old "Ironsides,"* which was similar in many ways to the "John Bull," as an examination of the model preserved in the National Museum will show. The success of this engine laid the foundation for the great Baldwin Locomotive Works, which is in existence to-day, sending locomotives to every part of the globe.

## The Line from Bordentown to South Amboy.

The Camden and Amboy Company having obtained control of the steamboat routes between Philadelphia and Bordentown, and between South Amboy and New York, directed their energies to completing the railway across the State.

Although the grading of the road from Bordentown to Camden had been commenced in the summer of 1831, work on that end of the line was abandoned for about two years, the entire construction force being put on the work between Bordentown and South Amboy.

The road from Bordentown to Hightstown was completed by the middle of September, 1832, and from Hightstown to South Amboy in the December following. The "deep cut" at South Amboy, and the curves of the track there, gave the civil engineers great trouble.

## The First American Standard Track.

The laying of the track through the "deep cut" led to an event of great importance to future railway construction. The authorities at Sing Sing having failed to deliver the stone

*A handsome model of the "Ironsides" was presented to the U. S. National Museum by the Baldwin Locomotive Company in 1888.

blocks rapidly enough, Mr. Stevens ordered hewn wooden cross-ties to be laid temporarily, and the rail to be directly spiked thereto. A number of these ties were laid on the sharpest curves in the cut. They showed such satisfactory properties when the road began to be operated that they were permitted to remain, and the stone blocks already in the track were replaced by wooden ties as rapidly as practicable. Without doubt the piece of track in "deep cut" was the first in the world to be laid according to the present American practice of spiking the rail directly to the cross-tie.

## The Line Opened Between Bordentown and South Amboy.

Among the memoranda compiled by Benjamin Fish, published in his memoir, I find the following:

"First cars were put on the Camden and Amboy Railroad September 19, 1832. They were drawn by two horses. They took the directors and a few friends from Bordentown to Hightstown and back.

"On December 17, 1832, the first passengers were taken from Bordentown through to South Amboy. Fifty or sixty people went. It was a rainy day.

"On January 24, 1833, the first freight cars were put on the railroad. There were three cars, drawn by one horse each, with six or seven thousand pounds of freight on each car.

"Freight came from New York by steamboat to South Amboy. I drove the first car, John Twine drove the second car and Edmund Page the third one. We came to the Sand Hills (near Bordentown) by railroad, there loaded the goods on wagons (it was winter, and the river was frozen over), arriving in Philadelphia by sunrise next morning. The goods left New York at 12 o'clock, noon. This was done by the old firm of Hill, Fish & Abbe."

Immediately after the road from Bordentown to South Amboy was completed, and as late as the summer of 1833, passengers were brought from Philadelphia to the wharf at White Hill by steamboat, and from there were rapidly driven to Amboy. Two horses were hitched to each car, and as they were driven continuously on the run, three changes of horses

From Illustrations in
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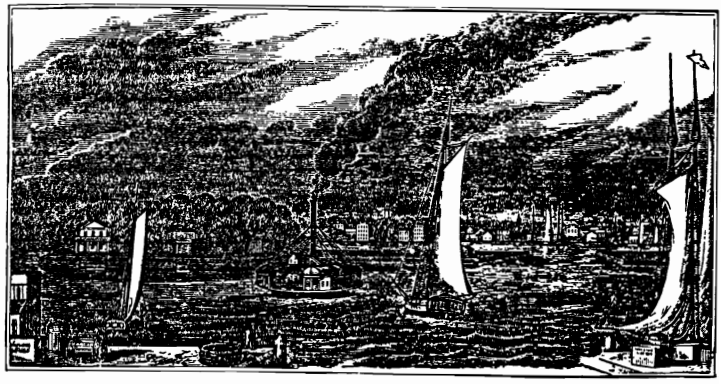
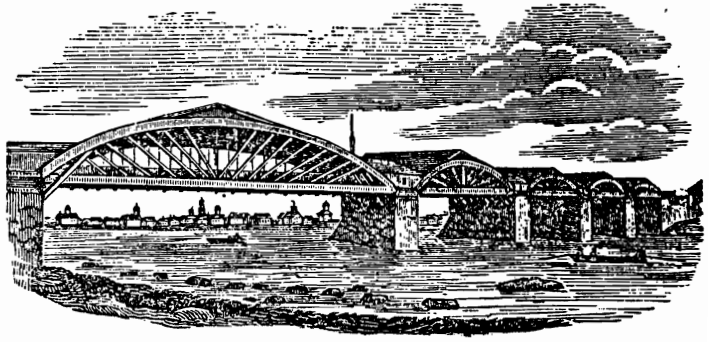


VIEW OF CAMDEN FROM PHILADELPHIA, 1842.
The engraving shows the appearance of Camden, as seen from Walnut street ferry, Philadelphi. Windmill or Smith's Island appears in front of the city. The canal, for steam ferry boats, through the island, is seen on the right.

ARCH OVER THE RAILROAD, BORDENTOWN, 1842.



BRIDGE ACROSS THE DELAWARE, AT TRENTON, 1842.

were required, the finest horses obtainable being purchased for this purpose. The time consumed in crossing the State (thirty-four miles) was from two and a-half to three hours.

Early in September, 1833, the locomotive "John Bull" was put on the train leaving Bordentown about 7 o'clock in the morning, and returning leaving South Amboy at 4 P. M. This was the first passenger train regularly run by steam on the route between New York and Philadelphia.

### THE LINE OPENED FROM BORDENTOWN TO CAMDEN.

In the spring of 1833 work was again commenced, and proceeded with such vigor as to permit the road to be operated from Bordentown to below Rancocas creek (twelve miles) in the late fall and winter of 1833.

At that time stage-coaches left Toy's Hotel, Camden, at 8 A. M. and 3 P. M., conveying passengers to Rancocas; from there cars and locomotive conveyed them to Bordentown, where the locomotive was detached, horses hauling the cars through to and from South Amboy, except one line which was run all the way through by a locomotive after October, 1833.

In January, 1834, the late Robert C. Buzby (who, on the 4th of March, 1883, completed a half century of continuous service in the employ of the company) ran the first engine — No. 2 — into Camden in the morning to bring the mail out in the afternoon, and George Vernon ran the first regular train that carried the mail into Camden the same day.

In a letter Mr. Buzby thus described his first trip to Camden:

"I left Bordentown at 9 A. M. with the mail, and ran as far as Cooper's creek bridge, Camden, which was not completed, so I was compelled to take the engine back to the temporary engine house near Pensaukin creek. There the engine was laid up for the night. It was bitter cold, so I remained with the engine all night to keep it from freezing up. Next morning early Edwin A. Stevens drove out in a sleigh and reported that the bridge was ready for travel, so we took the engine down to bring out the mail train in the afternoon. Edwin Stevens rode with me on the engine. He insisted on my running fast over what is now called Haddon Avenue crossing,

which I did, but owing to the frozen mud the *snow plow and pilot* were thrown off the rails, and I had to get off and put them on the track before we could go on."

## Growth of the Railroad System in New Jersey.

The Camden and Amboy Railroad as originally constructed consisted of a single-track railway from Camden to South Amboy, sixty-one miles.

During the years 1830–31–32 nine railroad companies* and four canal companies were chartered by the Legislature of New Jersey.

This was the state of the development of the railroad system of New Jersey in January, 1834, when the road from Camden through to South Amboy was opened for traffic.

## Control Obtained of the Philadelphia and Trenton Railroad.

In Pennsylvania the Philadelphia and Trenton Railroad Co., chartered February 23, 1832, had nearly completed the road from Morrisville (opposite Trenton) to Bristol in 1833, and thence to Kensington in the beginning of 1835, and had secured a majority of the stock of the Trenton Bridge Company

| | |
|---|---|
| *1. Feb. 4, 1830—Camden and Amboy R. R. and Transportation Co., Camden to South Amboy, | $1,000,000 |
| 2. Jan. 21, 1831—Paterson and Hudson River R. R., opposite N. Y., Paterson through to the Hudson, | 250,000 |
| 3. Feb. 3, 1831—Paterson Junction R. R., | 20,000 |
| 4. Feb. 12, 1831—West Jersey R. R., from C. & A. R. R., near Camden, to any point in Penn's Neck, Salem Co., | 500,000 |
| 5. Feb. 9, 1831—Elizabethtown and Somerville and Plainfield, through Bound Brook, | 200,000 |
| 6. Mar. 7, 1832—New Jersey R. R., from New Brunswick to Jersey City, through Woodbridge, Rahway, Elizabethtown and Newark, | 750,000 |
| 7. Mar. 8, 1832—Paterson and Fort Lee R. R., from Paterson to Fort Lee on the Hudson, | 200,000 |
| 8. Mar. 8, 1832—New Jersey, Hudson and Delaware, from any point on the Delaware between N. Y. State line and mouth of Paulins Kill, Sussex Co., to the Hudson opposite N. Y., but not to cross the Passaic south of Belleville, nor to run south of the turnpike road from Newark to Jersey City, | 1,000,000 |
| 9. Feb. 11, 1833—Delaware and Jobstown Rail and Macadamized Road, from near mouth of Craft's Creek (below Bordentown) on the Delaware to New Lisbon, through the villages of Columbus, Jobstown and Johnstown, | 60,000 |

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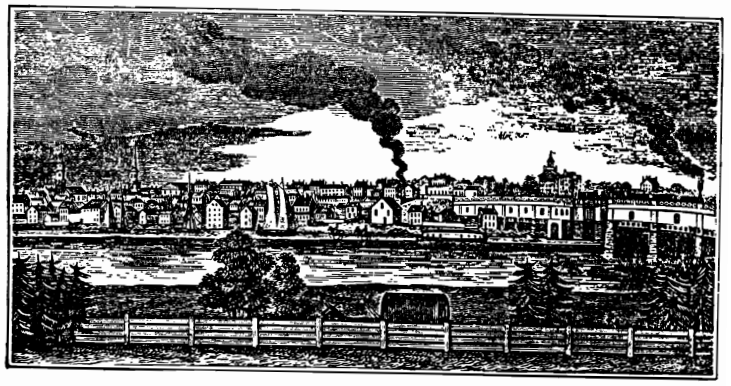
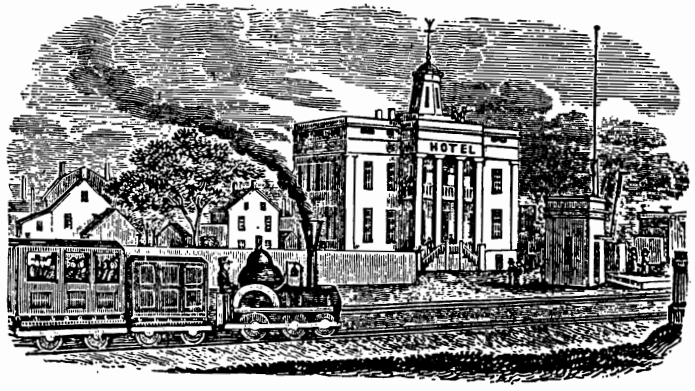


N. E. VIEW OF NEW BRUNSWICK, N. J., 1842.
On the right is seen the Railroad Bridge, above which, on an eminence, is seen Rutger's Colleg
The Delaware and Raritan Canal, passing along Raritan River, is seen in front of the city.




CENTRAL PART OF RAHWAY, 1842.

S. E. VIEW OF JERSEY CITY, FROM NEW YORK, 1842.
The above shows the appearance of Jersey City as seen from near the Battery, in New Yo
The works of the Jersey City Glass Co. are seen on the left; the car house of the
New Jersey Railroad is seen on the right.

and the Trenton and New Brunswick Turnpike Company. They also claimed that the right to lay rails on the turnpike was authorized by the charter of the latter company.

The financial success * of the Joint Companies caused other capitalists to covet the right to build a road across the State. The "Anti-monopolists" were loud in their clamor and had published a pamphlet entitled "A Proposition to Abolish Ex-"clusive Privileges in New Jersey," which had been issued and widely read. To satisfy their demands the Legislature of 1835 had appointed a committee to confer with the Camden and Amboy Company in regard to the purchase of their works by the State.

### The New Jersey Railroad Opened.

The New Jersey Railroad, which had opened its line † from the Hudson river as far as Elizabeth in 1834, had almost completed the line through to New Brunswick in the latter part of '35, and rumors were numerous as to rival roads, the public being wrought up to a high pitch of excitement by discussions in the press and by public meetings.

In order to avoid litigation, Captain Stockton and others interested quietly bought up a controlling interest in the stock of the Philadelphia and Trenton Railroad, and obtained control also of the bridge at Trenton and the turnpike from Trenton to New Brunswick, thus putting an end to opposition from that quarter.

### Agreement Ratified with the New Jersey Railroad.

In September, 1836, the Joint Companies and the Philadelphia and Trenton Railroad Company entered into an agreement with the New Jersey Railroad, in which they covenanted to build a railroad from Bordentown to New Brunswick in order to complete an all-rail through line from Philadelphia to New York. It was also agreed, when the road was completed, "that the price for passage from New "York to Philadelphia shall be $4.00 for day passengers and "$5.00 for night passengers, and the receipts from passengers

*The stock was selling at $134 in July, 1835, par $100.
† See description among branch roads.

"be divided in *pro rata* proportion as to the length of the respec-
"tive railroads used in this transportation," the fare by the old route from Philadelphia *via* Bordentown and Amboy to remain at "the present rate of $3.00 for regular passengers "and $2.00 for forward deck passengers."

The agreement was signed by R. F. Stockton, president Delaware and Raritan Canal; R. L. Stevens, president Camden and Amboy Railroad and Transportation Company; J. F. Darcy, president New Jersey Railroad and Transportation Company; John Nagly, president Philadelphia and Trenton Railroad, and is probably the first agreement made in this country to provide for the pooling of railroad earnings.

## Financial Troubles and Panic of 1837.

When this agreement was ratified arrangements were made to commence and complete the road promptly,* but a crisis in the money market followed the failure of the United States Bank, and the disastrous panic of 1837 caused a halt.

On April 11, 1837, the board of directors having been notified "that certain sterling bills of exchange, guaranteed by "the Bank of the United States, on Baring Brothers & Co., of "London, had gone to protest, and as the construction of the "contemplated railroad from Bordentown to New Brunswick "requires an immediate loan of $1,000,000," the secretary of the company was directed "to urge upon him (Captain Stockton) the indispensable necessity of his acceptance of the appointment to go to London and attempt the negotiation of four hundred and fifty sterling $500 six per cent. bonds for the completion of the road." †

The appointment was accepted and Captain Stockton sailed for Europe. On September 18, 1837, the board had received bills of exchange amounting to £82,888 5*s*. 8*d*. from Captain Stockton, and notwithstanding the fact that during the summer and fall of 1837 the business of the country languished,

*The right to build this road was conferred by the Act approved March 2, 1832, requiring the C. & A. Co. to build a road to New Brunswick from a point at or west of Spottswood as soon as the road from Jersey City to New Brunswick was built.

†One of the first negotiations of American R. R. securities in a foreign market.



the work on the proposed road from Trenton to Bordentown was "commenced in September, 1837, and passengers carried "upon it in 1838. This road branched from the main line of "the Camden and Amboy Railroad in the borough of Borden-"town, at Prince street, following around the edge of the hill "and crossing the Crosswick's creek immediately upon above "the mouth or entrance of the Delaware and Raritan Canal, "thence following the tow-path on the right bank of the canal "to Trenton." *

## Lease of the Canal: Failure to Comply with Agreement.

Negotiations for the lease of the Delaware and Raritan Canal by a syndicate of capitalists had been going on for some time, and in 1837 an agreement was signed by S. L. Southard, of Trenton, and D. B. Ogden, of New York, on their part, and by R. F. Stockton and R. L. Stevens, on the part of the joint companies, to lease the canal for fifteen years —at an average rate of 6 per cent., to be paid (4 per cent. first year, 5 per cent. second year, and 6 per cent. third year and 6½ per cent. for each of the remaining twelve years) "upon "the said cost to be ascertained by the books of the said com-"pany"— the parties stipulating "that they will not transport, "nor permit any other persons to transport, any passengers on "said canal." Upon the basis of this lease Captain Stockton succeeded in negotiating the proposed loan. For some reason the terms of this lease were never carried out by Messrs. Southard and Ogden, much to the chagrin of Captain Stockton, who had succeeded in negotiations with the English capitalists, largely through the confidence given in the credit of the joint companies by the lease of the canal. On the 18th November a letter was received from him, stating to the board "that rumors had been circulated [in England] that the whole "matter of the lease was a mere device to enable him to "impose upon the confidence and credulity of capitalists in "England; while the character of Messrs. Ogden and Southard "might satisfy the public in the United States, that in Eng-"land nothing but the names of those parties who were spoken

*Original Report to Stockholders, 1840.

"of at the time of making the lease as having abundant "means, and their reasons for not complying with their con- "tract, would satisfy the capitalists who had loaned their "money in consideration of that lease, and rescue my charac- "ter from the imputation that had been cast upon it at home "as well as abroad."

### Through All-Rail Route Demanded.

The managers of the New Jersey Railroad had become most anxious. They saw the necessity of the completion of the through connection to Philadelphia, and were disappointed with the delay in getting the road from Trenton to New Brunswick built. Over a year and a-half had elapsed since the agreement of September, '36, and not a spade had been put in the ground west of New Brunswick for this line.

### Railroad from Trenton to New Brunswick Completed.

Commodore Stockton, notwithstanding the fact that he was hampered by the reports involving his integrity, was able to consummate the negotiations of enough bonds to pay for the construction of the road, and in June, 1838, the grading was commenced; the work was pushed so vigorously that in six months from that time the twenty-four miles of road to Trenton was completed.

The branch from Trenton to New Brunswick originally followed the tow-path on the east bank of the Delaware and Raritan Canal, about thirteen miles, to a point near Kingston, "thence for some distance on the present Rocky Hill branch, "up the valley of Heathcote brook, to its summit between it "and Lawrence brook, on what was called Long Bridge "Farm, thence down Lawrence's brook to Dean's mill- "dam* near George's road, thence in a straight line in the "direction of New Brunswick to its intersection with the New "Jersey Railroad† about three and a-half miles from the rail- "road bridge over the Raritan river at New Brunswick.‡

*This portion of the line was abandoned several years ago.

†The N. J. R. R. had been built as far west as the city limits of New Brunswick would allow, so that the length of the Trenton and New Brunswick branch was diminished 3½ miles.

‡Original description in survey.



### All-Rail Route Philadelphia to New York Completed.

This first through all-rail line from Philadelphia to New York, which is now one of the most valuable railroad properties in the world, was put in full operation January 1, 1839. For a number of years trains changed engines at Trenton and New Brunswick, and not unfrequently thirty or fifty minutes were consumed in "wooding-up" the tenders at the wood-sheds along the line.

Gradually additional facilities in the way of close connections,* etc., were completed and through cars were put on the trains. The saving in time by the all-rail route from Philadelphia to Jersey City made it a most popular line.

In 1839 the Trenton bridge was rebuilt to carry locomotives. Previous to that time passengers had been hauled from Morrisville across the river in stages drawn by horses, the New York cars being near the river bank to receive them. The rivalry of competing lines, who conveyed passengers to Trenton by boat and thence to New Brunswick by "Captain "Reeside's celebrated drivers" and other stage lines, was broken up by the opening of the railroad from Trenton to New Brunswick in January, 1839, and the gaily-painted stage-coach, with its prancing steeds and dashing drivers, became a thing of the past.

*Up to 1840 all passengers changed cars and walked over the canal bridge at Trenton because the gauge of the Philadelphia and Trenton railroad was 5 ft., while the Camden and Amboy gauge was 4 ft. 8½ in.

## METHOD OF MANAGEMENT.

Although there was practically but one company, as Commodore Stockton (and his father-in-law, John Potter, owned the majority of the stock in the canal) they directed its affairs; the Stevens brothers, Robert L. and Edwin (with their father, John Stevens) became the active managers of the road. The former took charge of laying the track and procuring equipment, while the other looked after the political, financial and practical management of affairs. Considerable judgment had to be used in both of these branches. No laws had been established in regard to the steps to be taken in the purchase of right of way, and many of the New Jersey legislators were very chary when they were asked to grant franchises and rights. In Mr. Robert L. Stevens's department the field was indeed wide. The few short railways built at that time were isolated and separated by considerable distance, which in those days was a difficulty not easily surmounted. When we think of the fact that Robert L. Stevens was compelled to begin to lay track and provide engines and cars for a railroad with no experience to guide him, and with no experienced railroad men to consult, we can form some idea of the responsibility which rested upon his shoulders and the perplexing problems he was called upon to solve. But the son of the great inventor "knew no such word as fail," and he bent himself to the task with a success that was remarkable.

### Early Design.

As has been said before the organization of the Camden and Amboy Railroad was the outgrowth of the Union Line, which carried nearly all the freight across the State. The road was originally designed to be run, if necessary, by horse power, which was regarded as a certainty, while steam was looked upon, as an expensive possibility only, by some of the directors. So in the early plans of the construction of the road, conveniences for operating it by horse power were especially looked after.



The railroad was built upon the most approved plan, no money being spared to make it substantial in every particular. The canal was built for the accommodation of heavy and bulky freight—lumber, coal, etc. Upon the railroad nothing was to be carried besides passengers and their baggage except, perhaps, what we would now call box freight and express goods, the idea being that the engines and cars should be as light as possible so long as safety was assured.

In 1840–50 many experiments were made by the Camden and Amboy Railroad in order to test wood preservatives. At Bordentown large tanks were constructed for "kyanizing" ties and planks: the timber was cross-piled, layers of lime and salt being put on at intervals, the remaining space being filled with water and the timber allowed to saturate in this solution for several days. In some cases the wooden "sleepers," as the cross-ties were then called, were laid in trenches filled with lime; sometimes the ties were charred and sometimes coated with tar.

None of these experiments having proven of sufficient practical benefit they were abandoned. But they are, however, interesting to recall, as they show the energy displayed by the early managers of the road in their desire to preserve and perfect the track superstructure.

### The Agreement with the State.

By the charter of these companies the canal was to revert to the State in fifty years and the railroad in thirty years* from the date of their completion, at fair valuation, if the State desired. This arrangement entailed a peculiar condition of affairs in respect to ownership, etc. The directors, in their report to the stockholders in 1840, called attention to the fact as follows:

"We now proceed to say a word or two in relation to the "value of your property and the terms by which you hold it.

* This was changed by act of March 16, 1854—the time when the purchase could be made by the State of the railroad being made the same as the canal, "and not sooner," and "the time for the appointment of the "appraisers provided for in the 25th section of the act incorporating the "canal, and the 22d section of the act incorporating the said railroad "company, is hereby fixed and declared to be in the year 1888."

"Although you have paid for it, and New Jersey has not advanced or loaned you a dollar on it, still the fee is in her — not in you. You are the lessee for a term of years only, and the State can, after reimbursing you, dissolve the corporation — the railroad at the expiration of thirty years from and after its completion, the canal at the expiration of fifty years from and after its completion. The relation that exists between you and the State is simply that of landlord and tenant, with restrictions dictated by the State and ratified by different legislatures.

"You now furnish the State of New Jersey an annual sum sufficient to pay the expenses of the State government, and which will no doubt increase so as to enable her, by this means, to purchase all your works at the expiration of the lease you hold under her."

Although this matter was always brought prominently before the people by the companies whenever additional privileges were asked for, the corporation had many enemies. As early as 1835 the Legislature passed the following resolution:

"*Whereas*, by laws heretofore passed by the Legislature of this State, certain exclusive privileges were conferred upon the Delaware and Raritan Canal and Camden and Amboy Transportation Company; and

"*Whereas* it is represented that a large portion of the people of New Jersey are desirous that exclusive privileges should be extinguished in some just, honorable and legal manner; and

"*Whereas* it is manifest that the desirable object can alone be attained by and with the consent of said companies; therefore

"RESOLVED, That a committee of seven (7) be appointed to inquire of said companies whether they are willing to surrender to the State the whole of their works, and if so, on what terms."

## PROPOSITION TO THE STATE TO PURCHASE.

Seven million one hundred and sixty-five thousand dollars was the price named by the companies, and simultaneously with this offer to the State the Philadelphia and Trenton Railroad Company and the Trenton and New Brunswick Turnpike Company offered to lease these works from the State at six per cent. per annum ($459,000) for thirty-six years and, in addition, to pay the State twenty-five cents on every passenger carried across the State. These negotiations, however, fell through, and the railroad and canal were conducted upon the original policy.



To those who viewed public sentiment closely, and the Messrs. Stockton and Stevens should certainly be classed among that number, it began to be evident that the popular feeling throughout the Commonwealth was against the purchase of these works by the State. "As long as the revenue to the State from transit duty, etc., amounted to such a handsome sum, why should the State want to go into the railroad business?" was the question asked. Although this proposition to the State was kept uppermost in the minds of the people by documents and public utterances, the more shrewd observers of events were satisfied that the transfer would never be made. The charter to these companies, however, worded as it was, "That it shall not be lawful at any time during the said railroad charter to construct any other railroad in this State without the consent of said companies, which shall be intended or used for the transportation of merchandise between the cities of New York and Philadelphia, to compete in business with the railroad authorized by this act," was the bone of contention over which legislatures battled, and the friends and foes of the corporation were engaged in continual warfare.

## THE "MONOPOLY" BRINGS PROSPERITY TO THE STATE.

Although the joint companies were protected by this legislative enactment, the Messrs. Stevens and Stockton were not enabled to conduct the road and canal without fear of rivals, as they were compelled to combat many ingenious devices which were attempted in order to construct competing lines.

As the world moves changes take place in the policies of nations, States and even corporations.

To-day, when a general railroad law exists in New Jersey and no railway can prevent another from being built by its side, the carrying companies vie with each other to provide speedy trains, comfortable cars and stations, and what is far more necessary, they take every possible precaution against

accident, believing that the public appreciates "safety, speed and comfort," and that they will patronize the road which will give them the best opportunity to enjoy these essentials.

With the early managers of these companies such matters, while thought of, were not regarded of such vital importance.

Monopoly of the stage route, monopoly of the bridge, monopoly of the turnpike, had been the policy of the State in order to encourage internal improvements.

Colonel John Stevens had been driven from the Hudson with his boats by Fulton. Potter had invested his fortune in the canal under the State guarantee of defense against rivals, and they and others believed that they were entitled to protection from competition. They argued that they had risked their time and money in an enterprise the success of which was doubtful.

They foresaw much of the future prosperity of the State, it is true, but they believed that the sole control of the lines of communication between the cities of New York and Philadelphia *was a right* that they should never be asked to relinquish.

In the early strides of progress in every new country such protection is necessary and has generally been granted, and throughout the many and bitter contests in courts and legislative halls the managers of the joint companies during the first twenty-five years of their existence were almost always successful. As the railroad paid a tax to the State on each passenger that it carried across the State, and as the business of the road increased rapidly, the treasury of the State received a handsome sum each year, and as, according to the charter, the day might come when the property of the road (if the State purchased it at the end of thirty years) might be a matter of vast importance to the State, it is easy to see upon what grounds the railway managers asked for and received protection from proposed competing lines.

While we are tempted at this day to criticise adversely the public men who lent their assistance to such legislation as this, we should also consider the important results to the Commonwealth that were brought about by the determined battles which the early friends of this railroad fought in defence of what they believed to be their rights.



As the business of the country developed the necessity for other lines of communication became apparent to those, especially of a younger generation, who argued that this company had been protected long enough. They pointed to the fact that large dividends had been declared, and they claimed that the owners of these roads should not continue to prevent the development of the business and resources of the State simply for their own pecuniary benefit. But with the Messrs. Stockton and Stevens the sole right to control the traffic between New York and Philadelphia was an inborn principle which they never relinquished while they were at the helm.

## Growth of the Business.

It is estimated that 2,000 persons each way passed over the public road from New York to Philadelphia in 1790, the Union Line and all opposition lines carrying about 2,800 in 1825. In 1832, the first year the Camden and Amboy line was opened, it is estimated that the "through passenger "business was about 52,000."

The through business for the succeeding years was as follows:

| | *Tons of Freight via C. & A. R. R.* | *Tons of Freight via D. & R. Canal.* | *Passengers via C. & A. R. R.* |
|---|---|---|---|
| 1835 | 6,875 | 57,736 | 147,424 |
| 1840* | 11,325 | 172,120 | 153,112 |
| 1850 | 42,242 | 568,403 | 345,425 |
| 1860 | 183,750 | 1,639,998 | 479,330 |

## The New York and Newark Railroad.

According to the charter of the N. J. R. R. (March 1, 1832) that company was permitted "to make a branch road to any "ferry on the Hudson river opposite New York which shall "join the main road within 100 yards of the Hackensack river

*Averaging a carload at 31 passengers, about 5,000 carloads of through passengers were carried in 1840 — about 17 carloads a day. Two trains each day each way, of 4 cars each, would have done the entire business. Only 15 first-class passenger cars were then owned by this company. The freight business quadrupled each decade on the railroad and tripled on the canal; the passenger business tripled in the first eight years, more than doubled in the next decade and increased 40 per cent. in the next.

"* * * or at such point as shall best give to the ferries equal "facilities for communication with Newark, and if the com- "pany do not construct such branch as soon as the main road "from Newark to the Hudson shall be made, the law author- "izes the said ferry to do so with the same power and liabili- "ties as the company."

The ferry alluded to was the Hoboken Ferry, in which the Messrs. Stevens owned a large interest, and the differences of opinion between them and the managers of the New Jersey Railroad in regard to this clause in the charter was one cause that led to famous legislative conflict of 1860–1865.

### The Great Railroad Conflict.

The New Jersey Railroad had been restless for some time. By the terms of their agreement with the Camden and Amboy Railroad they only received one-sixth of the gross through receipts, as their road, while comprising one-third of the all-rail line between Philadelphia and New York, was only one-sixth of the total length of both roads. An application for the road over from Millstone "for local purposes" was before the Legislature. The exclusive privileges given to the Camden and Amboy Railroad were denounced as unconstitutional. Opinions were obtained from the most distinguished jurists in the country in regard to the matter. The government even was appealed to to build a "post road" from Washington to New York.

The War of the Rebellion followed in 1861, and the importance of the line between Trenton and New York became more and more apparent. The Camden and Amboy Company were considering the propriety of pushing their own road across the State from New Brunswick towards Hoboken, and a crisis in railroad affairs had arrived.

### The United New Jersey Railroad and Canal Co.

The more conservative directors of the two companies saw that if this condition of affairs continued long the second road *

* On the 16th of March, 1854, the Legislature of New Jersey had passed a law by which it was enacted: "That after the first day of January, in "the year 1869, it shall be lawful, without the consent of the said Dela- "ware and Raritan Canal and Camden and Amboy Railroad and Trans- "portation Company, to construct a railroad or railroads in the State for "the transportation of passengers or merchandise between the cities of "New York and Philadelphia," and "that it shall not be lawful, before "the said first day of January, 1869, to construct any other railroad or "railroads in this State, without the consent of the said joint companies, "which shall be used for the transportation of passengers or merchandise "between the cities of New York and Philadelphia."



would soon be built, and that it would result in the companies coming together in a compromise at the end with increased capital. Finally negotiations were entered into in 1865, and concluded during the fall and winter of 1866, by Ashbel Welch on the part of the Joint Companies, and Hamilton Fish for the New Jersey roads.

Robert L. Stevens having died in 1856, Edwin A. Stevens was the only early manager of the road who remained to take part in this conflict. He at first was inclined to favor the negotiations, but not being able to agree with the committee appointed to make the merger, owing to his belief that the concession offered in the valuation of New Jersey Railroad stock was too liberal, he practically withdrew from the management of the companies and devoted his attention to the construction of the road from Hoboken to Newark, which has now become an important link in the Morris and Essex Railroad.

The merger of the stock of the joint companies and the New Jersey Railroad was finally consummated in 1867.

This was the end of what was, perhaps, the most determined battle for railroad supremacy ever fought in this country. The contest was most bitter for years. The public prints were freely used as a medium for keeping the matter before the people — pamphlets were published and widely distributed by the partisans of both sides — William Cullen Bryant, in the New York *Evening Post*, taking an active part in the discussion.

By the act passed February 27, 1867, the joint companies, together with the New Jersey Railroad, were authorized "to "make such agreement for consolidation of interests as they "may deem proper and expedient," if, "ratified by two-thirds "in interest of the stockholders of each of said companies."

The articles of agreement by which the "United New Jersey "Railways and Canal Company" were organized was signed January 28, 1867, "to take effect as of the first day of January, "1867."

The names signed to the agreement were Ashbel Welch, Jos. P. Bradley, J. G. Stevens, C. Macalister, John Hulme, E. S. Sanford, for the D. and R. Canal and Camden and Amboy Railroad.

Hamilton Fish, Martin A. Howell, I. W. Scudder, A. L. Dennis, for the New Jersey Railroad and Transportation Co.

By the terms of the agreement each of these companies continued to maintain separate organizations, but all the directors of each company met in a joint board at stated intervals.

### Profitable Local Business Developed.

The Camden and Amboy Railroad had a similar experience to all roads that had their termini in large cities — they were disappointed in the revenues from through business and agreeably surprised in the development of the local traffic. Settlements grew up rapidly along the line, and the cities through which the road passed became more populous. The development of the Pennsylvania coal lands created an enormous business for the canal, the tonnage in 1871 being over three million tons, and exceeding the amount transported that year through the Erie Canal. New Jersey became a manufacturing State, and the growth of manufactures there, as well as in the adjoining States, contributed materially to the enormous freight traffic that was increased yearly by the extension of southern and western connections.

Before the year 1850 the amount of westward tonnage on the railroad was more than double of that east bound, the large volume of coal being shipped to the seaboard by boat.

### Coal Traffic Established by Railways.

Between 1855–60 coal was shipped by rail in large quantities, and South Amboy became a great shipping center of the anthracite business, and large piers and wharves, with shutes and other improved contrivances for handling coal, were built at that point.

### Meager Terminal Facilities.

But the terminal facilities of the Camden and Amboy Company were so meager that the average cost of handling a ton



of freight at New York and Philadelphia was more in 1860 than the expense of transporting it on the road for a distance of two hundred miles.*

This immense cost, said the late Ashbel Welch, in a conversation with me in regard to these matters "led me to "invent and adopt barges so constructed that loaded wagons "could be driven on board, the freight not being handled "but once until unloaded at destination. These were put in "use between New York and South Amboy, and by this "means the terminal expenses were reduced so that it equalled "the expense of transportation for one hundred miles."

### The Purchase of Harsimus Cove.

During the year 1866 arrangements were made for the purchase of Harsimus Cove, the price finally agreed upon being:

| | |
|---|---|
| To the State of New Jersey, . . . . | $500,000 |
| To other parties, . . . . . | 700,000 |
| For 70 acres, . . . . . | $1,200,000 |

This tract was afterwards increased in size. The acquisition of this valuable water front in New York harbor attracted the attention of the railroads with western connections, among them the Pennsylvania Railroad Company, who, in addition to their desire to reach New York, were also anxious to acquire a convenient outlet to their western connections.†

### Lease to the Pennsylvania Railroad Company.

Negotiations between the Pennsylvania Railroad Company and the United Railroads which began in the latter part of 1869 were continued during the year 1870. The final terms were practically agreed upon in the spring of 1871. The lease of these works to the Pennsylvania Railroad Company was executed on June 30, and the property was formally transferred at midnight, between November 30 and December 1, 1871.

* At that time Pier No. 1, New York, and Walnut-street Wharf, Philadelphia, were the only freight stations owned by the company in these cities.

† The late Ashbel Welch stated to me that John Edgar Thomson, president of the Pennsylvania Railroad, informed him that the desire to come into possession of Harsimus Cove property was the direct cause that led the company to agree to the 10 per cent. clause in the lease of the United Companies.

## CONCLUSION.

I have thus attempted to place upon record the circumstances connected with the birth and early history of the Camden and Amboy Railroad. The events that led to its origin are unique in railway history; its development in extent, power and influence were most remarkable.

Two of its founders, John and Robert L. Stevens, were men of national repute, who have left their impress for all time upon the systems of water and land steam transportation that have made this nation what it is. Many of the men connected with its management became prominent in the State and nation.

During the twenty years that have elapsed since the Camden and Amboy Railway became the Amboy Division of the Pennsylvania Railroad, the admirable system of track standards, in the introduction of which the Pennsylvania Company in America was the pioneer, has also been adopted on this road, and put into effect by the maintenance of way department. The great line from Philadelphia to Jersey City, via Trenton, has become one of the leading highways of America on account of excellence in construction and the safety, speed and comfort of its trains.

In another place* I have placed upon record many facts connected with the origin and early history of this great corporation, of whose success its officers and employes, present and past, have every reason to feel proud.

First opened for traffic in April, 1834, the growth of the Pennsylvania Railroad Company, especially of late years, has been remarkably rapid until now over 7,750 miles of railway are owned and leased or operated by its management.

Notwithstanding the fact that the first lines under its control were built through an exceedingly mountainous country; notwithstanding the fact that its general headquarters have the disadvantage of being located one hundred miles from the great financial and commercial center of the nation, it has established and still maintains a prestige which enables it to ob-

* The Semi-Centennial of the Pennsylvania Railroad Company, *Railroad Gazette*. April 11, 1884.



tain a large share of the traffic between the Atlantic seaboard, the Mississippi valley and the Pacific coast. To secure this measure of success has required able, energetic management and thorough organization in every department. Only by these means was it possible for "the Pennsylvania" to rise to a place among the greatest railroads of the world before the close of the first half century of the railway era.

Edgar Thomson, Scott, Roberts, Frank Thomson, Cassatt—are names that will forever be connected with the history of the development — I may almost say perfection — of the American railroad system of whose origin I have had occasion to speak to-day.

I believe it to be true that history perpetuated by things is more authentic, more valuable, than history recorded in words. Those who, with everlasting granite and enduring bronze, have marked this historic spot, around which cluster so many reminiscences of the introduction of steam transportation upon the Western Continent, have done an admirable work that will increase in importance as the years pass into decades, the decades into centuries. Verily, they have set an example worthy to be followed, and have proven that one corporation, at least, hath a soul!

The influence that the steam engine and the other epoch-making inventions have had upon the world's material progress were so fully set forth at the Patent Centennial Celebration, last April, that anything that I might add at this time would be trite indeed.

There is, however, a nobler era of national development which the railway has made possible. Other nations may possess as much wealth, exert as great power and enjoy as exalted a civilization as ours, but nowhere upon the face of the globe does mankind partake of the benefits of personal liberty to as great an extent as in free America. Without the railway and the telegraph (and without the railway there would have been no telegraph) this enviable condition could not have been reached.

Contemplate for a moment the circumstances existing previous to the foundation of the Union! In the South and West French and Spanish settlements had existed for hundreds of years — while the Dutch and English occupied our Eastern

shores, each nationality possessing peculiar traits of character inherited through centuries of contact with monarchical institutions. Among them were men of every sect and creed, Roman Catholics, Protestants and Quakers, each influenced by the most potent religious prejudices, and all bound by ties of kindred to the inhabitants of other shores — many owing allegiance to foreign kings. From these chaotic elements, and on the borders of a wilderness inhabited by savages, in a territory, a large portion of which was subject to the mal-influence of negro slavery, our forefathers, with a wisdom that seems almost superhuman, founded a Republic. But notwithstanding the attractions then offered by our free institutions to the oppressed of all lands, the nation — with roads that were impassable, with streams that were closed to navigation for months at a time — had a sluggish growth until the whistle of the steamboat echoed along the shores of the Father of Waters.

With the establishment of the iron highway connecting the Atlantic seaboard with the Ohio and Mississippi valley, then the lakes with the Gulf, and finally extending across the continent, how has the scene been changed ! !

The foreign tongue spoken by our ancestors of a few generations ago is seldom heard. Even the idioms and dialects peculiar to the natives of the East and South or West have almost disappeared. We have become one people — speaking one language, actuated by a common impulse "with malice toward none and charity for all."

Without the interchange of ideas and the intercommunication of our people, made possible by the railway, the ship of state could not have survived the storms through which it has passed ! Without the railway slavery would still be in existence in this free land ! ! Without the railway this grand Union of sixty-five millions of freemen would long ago have been divided into federations of petty States, each with a standing army, composed of the bone and sinew of the land, gnawing at the vitals of the State — retarding instead of aiding in industrial progress ! !

All hail to the Human Freedom League,* organized upon the 399th anniversary of the discovery of America, which, by

*The Human Freedom League was organized at Philadelphia, October 12, 1891. It has adopted a flag consisting of the stars and stripes placed between the tri-color of France and the flag of Switzerland.



the aid of the railroad, the telegraph and the newspaper, we have reason to hope will, long before our next centennial anniversary, secure liberty of thought and action to every member of the human race.

Could we lift the veil and peer into the future, we perchance might see steam superseded by that newer power, of which we know so little and expect so much ; another metal may take the place of that which has given the name to this the "Iron Age ;" perhaps, besides the great ships upon the waters and the huge locomotives upon the land, we may even see the winged aerodrome coursing the air in rapid flight : all bringing to our descendants a higher civilization and greater possibilities for advancement than we are capable to conceive.

But upon the pages of the histories of the 19th century, to be read by the millions yet unborn, it will be recorded that the birth of the steamboat and locomotive were coeval with the establishment and first growth of this great Republic, and that by them were secured eternal Liberty ! Union ! ! Peace ! ! !

# CELEBRATION*

Of the Sixtieth Anniversary of the First Movement by Steam on a Railway in the State of New Jersey.

Early in November, 1891, a handsomely engraved invitation to attend the ceremonies incident to the completion of the Monument was issued by a committee on behalf of the management of the Pennsylvania Railroad Company.

A fac-simile of the invitation is reproduced.

This invitation was accepted by prominent officers of the Pennsylvania and other railroad companies, officials of the Smithsonian Institution, U. S. National Museum, members of the New Jersey Historical Society, Pennsylvania Historical Society, New York Historical Society, American Historical Association, Franklin Institute, American Society of Civil Engineers, Engineers' Club of Philadelphia, the United States District Court of Philadelphia, Faculty of the University of Pennsylvania, Editors of New York, Philadelphia and Washington newspapers, the Local Press and Engineering Journals, and other prominent citizens. The invited guests were carried to Bordentown by special trains from Jersey City and Camden. Many residents of Bordentown and vicinity also participated in the ceremonies. Among them the Mayor and Common Council of the city, who attended in a body, as did the Faculty and Cadets from the Bordentown Military Institute.

Among those present of the "Old Guard" were Joseph Wood, aged 82 years, and John Flynn, Sr., aged 83, both of whom were in the employ of the Camden and Amboy Railroad when the first piece of track was laid in 1831. Isaac Dripps, who first ran the "John Bull" in 1831, expected to be present, but was unable to attend on account of ill health: he was represented by his son. Mrs. Stevens, of Castle Point, Hoboken, New Jersey, widow of Edwin A. Stevens, one of the originators and early managers of the road, was present. She was accompanied by Dr. Francis B. Stevens, (who was employed by the C. & A. R. R. in 1832), the oldest male descendent of John Stevens. General John S. Irick, of Vincentown, New Jersey, and Honorable N. S. Rue, of Hightstown, both of whom were prominent in the Councils of the Camden and Amboy Railroad for many years, were also present.

*Reprinted from Memorial pamphlet issued by the Pennsylvania Railroad Company, November, 1891.



## THE CEREMONIES.

The hour set for the ceremonies having arrived, General William S. Striker, Vice-President of the New Jersey Historical Society, who had been invited by the Committee to preside, called the assemblage to order: after speaking in complimentary terms of the occasion, he introduced Mr. Joseph T. Richards, Assistant Chief Engineer Pennsylvania Railroad Company, who delivered the address of presentation as follows:

### TRANSFER OF THE MONUMENT TO THE CUSTODY OF THE UNITED NEW JERSEY RAILROAD AND CANAL COMPANY BY JOSEPH T. RICHARDS, ASSISTANT CHIEF ENGINEER OF THE PENNSYLVANIA RAILROAD COMPANY.

We are assembled here to-day to give history a leaf. It is quite unusual to see active managing railroad men stop in their constructing and operating work and take the time to record or mark in history any of their deeds.

While the deeds of valor of brave warriors, the acts of wisdom of great Statesmen, and the memories of the martyrs and the saints have been for ages perpetuated in carved marble, bronze or upon the painted canvas, few attempts have been made to preserve in a like manner the record of the achievements of the railroad builders or managers — who have aided so materially in the world's progress. It is, in a degree, to do justice to the memories of these, and to recall the acts of the other public-spirited men who initiated the railroad era upon this continent, that we are assembled upon this historic ground to-day.

It is my task to-day simply to place upon record the circumstances that led up to the erection of this milestone in the highway of history, consisting of a simple cube of granite embellished by a bronze tablet bearing an appropriate inscription.

Some years ago the United States Railroad Historian, Mr. J. Elfreth Watkins, of the Smithsonian Institution at Washington, called our attention to the fact that at this location the first piece of railroad track was laid in the State of New Jersey. In fact it was one of the first pieces of track laid on any part of the vast system of lines now owned, leased and operated by the Pennsylvania Railroad Company. It was laid during the year 1831, and on November 12th of that year, just three-score years ago to-day, the English engine "John Bull" made its first trial trip for the purpose of demonstrating to the satisfaction of the Governor, members of Legislature and other public men of the State of New Jersey that a steam engine

would haul cars of passengers and freight on a railroad, as was claimed by the railroad men, and who then asked of the State authorities the right to operate locomotives for this purpose. The Governor, legislators and others, with their good wives, came from Trenton and elsewhere in carriages, and located themselves at the appointed hour along this turnpike and on yonder overhead bridge to witness what many a "doubting Thomas" thought would be a failure; but it was not. Upon this history I will not dwell, as another, a historian, will inform you of these matters more fully. So it simply remains for me to call attention to the duties performed by me in the construction of this monument and the measurement of this section of track. Shortly after Mr. Watkins had called our attention to this historical fact, a few of us were fortunate enough to secure the co-operation of Mr. Isaac Dripps, now alive and in his 82d year, and who is much interested in these ceremonies. He had assisted on the Camden and Amboy Railroad as a mechanic when only 20 years of age. When the "John Bull" arrived he put together the engine as the parts were hauled up from the river landing, a mile away on the water front of Bordentown. He also acted as engineer on the day the engine gave the successful exhibition of which I have just spoken. After a most careful examination of the field Mr. Dripps drove a stake at each end of the section of track, at which points you now see the two monuments. The larger monument needs an explanation, as its manner of construction is a matter of history well worth preserving. The foundation stones are the blocks upon which the rails were originally laid — cut to form a proper bond for masonry. The rail is from the original track, forty-two pounds per yard in weight, bent to form the circle. The joint-plates are from the original track, as are also the spikes, all of which we have gathered from old shops and material yards for the purpose — the stone blocks placed as supports for the rail are arranged without hammer dressing to show their original shape, and the cube of granite is a fitting milestone in the history of the railway.

I make this statement so that it may be known with what care and precision our work for this leaf of history has been done.

After the construction now comes the care, and on this sixtieth anniversary of the first movement by steam upon a railway between New York and Philadelphia, I hereby make, in behalf of the Pennsylvania Railroad Company, a formal transfer of this monument to the custody of the United New Jersey Railroad and Canal Company, and accordingly respectfully place the same under the care of Mr. F. Wolcott Jackson, general superintendent of the United Division of which the old Camden and Amboy Railroad now forms a part.



General Striker then introduced Mr. F. Wolcott Jackson, who delivered the address of acceptance.

ACCEPTANCE OF THE MONUMENT BY F. WOLCOTT JACKSON, GENERAL SUPERINTENDENT, UNITED RAILROADS OF NEW JERSEY DIVISION, PENNSYLVANIA RAILROAD.

This monument is erected to record an event of sixty years ago — the introduction of the steam engine as a means of transportation of passengers and freight in the State of New Jersey, and almost the earliest in the United States, by which such transportation could be made regardless of waterways.

The earlier routes of transportation were laid out so as to secure the shortest distance between waterways. The line of which this short line formed a part was to cover the space between the cities of New York and Philadelphia that could not be passed by water. A canal between the rivers Raritan and Delaware was chartered at the same time. The transportation of freight not requiring quick movement that was forced upon the rail route during the winter months was returned to the natural water routes and via the canal when navigation opened. It was not long before it was seen that for quick transportation of both passengers and freight the water communication must be abandoned as far as possible throughout the whole year, and that only slow freight movements could be continued on the water routes.

It cannot be said that railroads have superseded rivers and canals, or have done away with lake transportation, but they have enabled all parts of our country to be reached, and by far the greater part of the interior States would have remained undeveloped had not the steam engine for transportation been utilized.

The Camden and Amboy Railroad Company and the Delaware and Raritan Canal Company were, at their outset, rivals. Separated they would have crippled each other, and almost immediately after their organization they were united under the name of "The Joint Companies." As early as 1832 it was seen that the waterways, in connection with passenger travel, must give way to an all-rail route, and the New Jersey Railroad and Transportation Company's line was chartered, forming, with the Camden and Amboy Railroad and Branch subsequently chartered, an all-rail line between Jersey City and Camden throughout the entire year, with ferries at either end. The line from Trenton to Philadelphia, known as the Philadelphia and Trenton Railroad, was secured and operated by "The Joint Companies." These lines, from the period of their commencement to this time, have held an advanced position in the internal improvements of the country.

This monument is to commemorate the beginning of that system inaugurated in 1831. It is not improper to mention those who, as directors and officers, and those who, by their counsel and means, originated and developed these works. Their names recall those most active in the affairs of State as well as in internal improvements to whom New Jersey is largely indebted for the advanced position she holds among the States. We mention the names of Stockton, Stevens, Darcy and Jackson as of those who originated these works; the Potters, Neilson, Parker, Wall, Bayard, Benjamin Fish, Elmer, Green, Buckelew, McKnight, General Cook, Ashbel Welch, John R. Thompson, Corey, Pennington, Nevius, Scott, Acken, Chetwood, Colt, Gregory, are some of those who were among the earliest who, with their money and energies, united in developing what these men devised. These have all passed away. Among the living are Honorable Hamilton Fish, Judge Joseph P. Bradley and William H. Gatzmer, who were connected with the road more than thirty years ago; Isaac Dripps, who ran the first engine in the State of New Jersey, the "John Bull," and on this very spot, is still with us.

This granite monument, the memorial of the commencement of the work that has developed into the magnificent corporation known as the United New Jersey Railroad and Canal Company, is placed here as the act of another corporation, the peer of any other of its kind, whose name is known far and wide as the representative of progress, whose lines are inferior to none other in the world, whose credit stands high, and whose management, from the highest to the humblest, is endeavoring to advance the comfort and welfare of those with whom it comes in contact.

As chief officer of the Pennsylvania Railroad Company, lessee for 999 years, from June 30, 1871, of the works of the United New Jersey Railroad and Canal Company, in New Jersey, in their name, I accept the trust implied by the erection of this monument, and it will be a matter of honorable pride to emulate those who inaugurated and carried on these works as here commemorated.

The history of the origin and growth of these works to this time will be given by Mr. J. Elfreth Watkins, Curator of the Section of Transportation in the Smithsonian Institution, who was formerly an engineer of these lines.

At the conclusion of Mr. Jackson's remarks, the historical address was delivered by Mr. J. Elfreth Watkins, after which the ceremonies terminated, the guests from a distance returning by special trains.

# PRELIMINARY SURVEYS FOR CAMDEN AND AMBOY RAILROAD.

Report of MAJOR JOHN WILSON, U. S. A., October 11, 1830.

*To the President and Directors of the Camden and Amboy Railroad and Transportation Company.*

GENTLEMEN:—Having been appointed by you in June last to make the necessary examinations and surveys, and to locate a line of railroad between Camden and South Amboy, and having organized two corps to carry into effect the objects contemplated by your Company, I now respectfully offer you a brief report in relation to our operations. In order to obtain a thorough knowledge of the country it was deemed expedient to conduct lines of levels over different routes between Camden and Amboy which appeared to offer favorable ground for the construction of a railroad. With this view, lines were simultaneously traced from the points of termination at Camden and Amboy towards Crosswick's creek.

The first route that was explored from Camden followed nearly the direction of the Mount Holly road to its interjection with the eastern branch of Pensaukin creek; the line was then conducted to the west of Moorestown, and crossed Rankocus creek below the mouth of Tallman's creek; whence it was traced to the east of Slabtown and the Black-Horse, crossing the Assiscunk creek above the mouth of Barker's branch, and pursuing a northerly direction it finally reached Crosswick's creek at a favorable position above Groveville for crossing that stream with a bridge. The explored line from South Amboy to the position at Crosswick's creek followed generally the turnpike to a point about three miles beyond Spotswood; it then diverged eastwardly and ascended through a favorable ravine leading to the summit of the plain which divides the waters of the Manalapin branch of South river from Cranberry brook, a tributary of Millstone river, it then pursued a straight direction to Hightstown; thence it followed the turnpike as far as Centerville, and again diverging from that road, it was then conducted, after uniting with the line from Camden at Crosswick's creek, to the Mile Hollow or ravine on the lands of Count de Surveillers; thence to the wharf at Bordentown.

From the knowledge thus obtained of the country between South Amboy and Bordentown, it was deemed inexpedient to prosecute any further survey for routes from Centerville towards Amboy, but rather advisable for the party under the direction of Lieutenant Cook to return to the latter place and take accurate cross levels of the ridges and spurs

between the waters of the Raritan river and Cheesequakes creek, so as to ascertain the best method of overcoming the abrupt ascent on that portion of the route. After a thorough examination of the country in every possible direction, and after surveying various trial lines at different inclinations, it was found that to obtain a graduated line, even at thirty or thirty-five feet to the mile, it would be at the expense of a circuitous route and great increase of distance. It was therefore finally decided by the Directors as most advantageous to consider the first one hundred and fifty chains of the line from the wharf at South Amboy as an inclined plane having a rise of one foot in one hundred feet. There being no other points on the route to Cedarville which presented any serious obstacle to the location of a railroad, the party was accordingly directed to trace that much of the line until the further surveys between Crosswick's creek and Camden were completed.

The second route surveyed from Camden leaves the trace of the first line at a point west of Moorestown, and takes the direction of the Mount Holly road, which it crossed a short distance beyond the south branch of Rankocus creek. The line then kept east of the road, and after crossing the north branch of Rankocus creek and leaving Mount Holly immediately to the left, the survey was pursued to Jobstown. Thence to Georgetown; thence east of Recklesstown; thence to a point a short distance west of Shelltown; thence to Crosswick's, which it crossed below Waln's Mill. The line of the survey was also extended some distance beyond Crosswick's, in order to ascertain the features of the country in the neighborhood of Doctor's creek.

The third route surveyed from Camden to Crosswick's creek passed through Burlington; thence to the shore of the Delaware river, which it approached near the mouth of Craft's creek; thence along the shore of the river through White Hill to the wharf at Bordentown; thence over the marsh to the terrace below the Bellvidere (on the property of Count de Surveillers; thence along the face of the side hill bordering on the marsh of Crosswick's creek to the Mile Ravine, where the line branches. One branch was conducted along the side slope of the Mile Ravine, and after passing the Trenton road it was traced nearly in a direct line to Crosswick's creek, where it united with our former position above Groveville. The other branch, after crossing the Mile Ravine, was conducted to the side hill north of Mr. Pearson's house; thence along the side hill to a position near Middleton's house; thence over the meadows and Crosswick's creek to the bluff at the old landing. From the latter point the survey was continued to the neighborhood of Hightstown.

The face of the country over which the line was passed differed but little in its character from that before surveyed between Hightstown and the position above Groveville, both affording equal facilities for the formation of the main line of road.

As it was desirable that no route should be left unexplored from Bordentown eastward which offered any probability of superior advantages, another line was traced, passing through the ravine south of the



residence of the Count of Surveillers, and after crossing the Trenton and Amboy road it was conducted to the position above Groveville.

Having completed such preliminary surveys between Camden and South Amboy as appeared necessary to enable the Directors to form a judgment of the comparative advantages of the several routes which had been proposed for the main line of railroad, there was no hesitation on their part in selecting, in preference to any other, the *Western Route* passing through Burlington to Bordentown and thence towards Hightstown, crossing Crosswick's creek at the old landing below the turnpike. This latter route offered the shortest and easiest communication between the extreme points of the line, and at the least cost for construction. It also saved the necessity of a branch line, which must have been unavoidable had a more eastern route been adopted.

### Description of the Located Line from South Amboy to Camden.

The line begins at the first bridge on the wharf at South Amboy, and after curving from the wharf is located nearly in a direct line to the front of the house at present occupied by Mr. S. Gordon; it then follows the gentle sloping ground west of that house for upwards of three-fourths of a mile; then curves around a projecting point of a sand ridge, and keeps upon the east side of a ravine leading to the first high ridge near the old Amboy road, which it passes over; thence gaining the opposite ravine the line is located for some distance nearly parallel with the Bordentown turnpike. Thence, turning with an easy curve to the left, it again keeps a direction parallel with the turnpike, and passes south of Buccleugh's house. Thence to the dividing ridge between the waters of the Raritan and South rivers; thence north of Bloodgood's house, and after curving through a ravine which opens to the turnpike, is located to the south of Brown's Tavern. Thence running nearly parallel, and a short distance south of the turnpike, it crosses in its course Tennant's creek, Deep run, South river, and enters Herbertsville in the rear of the tavern. Thence skirting the slope bank of South river until it passes Vanwinkle's residence, it again keeps parallel with the turnpike for some distance, and then crosses it at Melanaphy's house. Thence it takes a direction toward Spotswood, which it leaves to the east; passing which, it is then located to the north of Snowhill's snuff mill and near his mill-dam. Thence keeping north of the turnpike, passing Bowen's residence, and afterwards south of his snuff mill; then curving to the left, it recrosses the turnpike at Bennett's saw mill, and after having been located near to his residence, takes a southwest direction to the south slope of a ravine, through which the line is traced to the summit of a ridge dividing the waters of South river and Cranberry brook. This latter summit was attained with a high graduation and deep cutting. Thence the line is located in a straight direction through the lands of Gordon and Davison to the crossing place at Cranberry brook;

after which it continues in the same straight line through lands of ——— Holland and ——— Dye. Thence passing over the Millstone creek, and bending to the right through Applegate's land, it crosses the turnpike and Rocky brook about a quarter of a mile northwest of Hightstown. Thence in a straight direction through lands of Messrs. Cook, Britton and others, it reaches the turnpike at a point not far beyond Wild Cat swamp. Thence running on the north side of the turnpike and parallel with it, it crosses Bear run at Appleton's; and keeping still the same course, it is conducted to Centerville. From Centerville the located line keeps a straight direction, and after crossing the Assanpink creek north of Hutchinson's mill and east of Ford's house, it approaches the turnpike, which it follows, and after crossing Mirey run attains Hungry Hill summit between the Cross-keys Tavern and Tindale's house. From this summit the line keeps a straight direction, and passes west of Mrs. Pearson's house; thence after crossing ——— creek, it is located to the bluff at the old landing on Crosswick's creek. Thence crossing the creek and meadow, it is conducted along the side hill as far as Mr. Pearson's residence. Thence passing the lane leading from the Trenton to the Amboy road, the line is located to a ravine, which it follows beyond the Trenton road. Thence curving to the left and passing to the eastern slope of a high ridge, which separates it from Crosswick's creek on the property of Count de Surveillers, it then keeps along the face of this ridge, and, after crossing a deep run, reaches the shore of Crosswick's creek. Thence along the face of the steep bluff of the creek to the Mile Ravine; thence across Mile Ravine to the margin of the opposite side; thence along the face of the hill to the terrace below the Bellvidere; thence over the marsh to the steep side hill on land of Count de Surveillers, which it follows to the wharf at Bordentown.

I must here take occasion to remark that the line located from Crosswick's creek (at the old landing) to Bordentown was done by Lieutenant Crook, in accordance with the views of a majority of the Directors. It was deemed advisable by the Company that various lines of road should be explored through the lands of Count de Surveillers with a view not only to ascertain their cost of construction, but also that they might have it in their power to offer any of them to the Count for his selection. The two lines which were traced through his lands to the position above Groveville; the one passing through the ravine near Bordentown and the other through the Mile Ravine were both abandoned, the first being too expensive and the second rejected by the Count in consequence of the manner in which it passed through his property. It being considered by the Directors that the position at Crosswick's creek at the old landing below the turnpike offered a more favorable route for locating the railroad to Amboy than any other, on account of the distance being shorter; two other lines were located through the lands of Count de Surveillers, the one already described in the statement of the preliminary surveys as branching from the Mile Ravine in a direction to Mr. Pearson's house and thence to Crosswick's creek, and the other located in conformity with the



views of the Count, excepting that portion of it which is traced on the western slope hill of the table land nearest the Trenton road.

The profile of a part of the first of these lines exhibited a graduation of thirty-five feet in the mile ascending east for one and a quarter miles, but in making an estimate of its cost that grade was increased for the same distance to forty feet per mile. There can be no hesitation in deciding that of all the lines located from Bordentown to the old landing at Crosswick's creek, the latter possesses superior advantages, not only for its shortness of distance but also for the straightness of its direction.

Its cost of construction at a graduation of thirty-five feet, beginning at the terrace below the Bellvidere, or thirty feet from the wharf at Bordentown, is also less than the other lines. The Count, however, refused his consent to this line being established by the Company through his lands.

The next line located was more to the westward than the one already mentioned, and its excess of distance eight chains. It was located level from the wharf at Bordentown at four feet above high water (mean tide) for half a mile; it then ascended for about a mile further at a grade of forty feet per mile, in order to diminish the expense of excavating through the table land through which it passed at a mean depth of seven feet; thence descending at thirty feet in the mile to Crosswick's, it united with the line located from South Amboy about midway in the meadow bordering on the creek.

In comparing either of these lines with that described in the location of the Main Route as approved by the Directors, the superiority of the first is unquestionable; and placing the other two at an equal cost for construction by diminishing the grade of the one to thirty-five feet; the difference in distance being seven chains fifty links, places them nearly equal as regards the time that would be taken for the travel of a locomotive engine for one mile on their respective inclinations of thirty and thirty-five feet, provided the curves are alike in each location.* This is not, however, the case; a reference to the map (accompanying this report) will at once exhibit the difference in the respective curvatures of the two lines. As carriages are kept on the rails by flanges on the wheels, it is obvious that where there is on any portion of the line an excess of curvature the friction from rubbing on the sides of the rails, and consequent retardation, must be very great. On the whole distance from Amboy to Crosswick's creek, with the exception of a single instance, the location is remarkable for the great length of the straight lines, which must well adapt the route for rapid communication. From the above considerations I have been induced to dissent from the manner of location of that part of the line between Crosswick's creek and Bordentown. I would, however, recommend to the Company, when staking it out for the

* Assuming the velocity of a locomotive engine on an inclination of thirty feet per mile at ten miles per hour, the comparative velocity in traveling with the same weight on an inclination of thirty-five feet per mile will be as the difference between the space $\frac{1666}{10000}$ and $\frac{1536}{10000}$ of a mile per minute passed over. While, therefore, the engine has passed over one mile on an inclination of thirty-five feet, it would have traveled one mile, six chains and seventy-two links on an inclination of thirty feet; and in the case of forty feet graduation the difference would be thirteen chains forty-five links.

road formation, to straighten the line in those places which were curved for the purpose of obtaining earth for embankments, as the charter granted by the Legislature empowers the Directors to take materials for that purpose "on or near the said route."

From Bordentown the location of the main line is continued, after crossing Black's creek near its mouth, along the shore of the Delaware river to Craft's creek, which is passed near its junction with that river.* The line then leaves the river shore and follows the side hill of the creek; thence through lands of ——— English and ——— Kale, passing between the house and barn of the former, and curving to the left crosses Kale's run and approaches the Burlington road. Thence keeping the direction of that road towards Garwood's house; thence continuing between Garwood's house and barn on a side hill; and bending to the right, it passes a projecting point of hill; then curving to the left and passing through Smith's nursery, it follows the Burlington road near its edge for three-fourths of a mile. Thence across the Asisscunk creek on the lower side of the present causeway; thence through Broad street in Burlington on its western side and fourteen feet from the centre; thence crossing London run, and continuing to the west of I. Cox's dwelling house. Thence west of the Burlington and Camden road, passing near Cooperstown church, and crossing the former about a mile distant from Cooperstown. Thence to the Rankocus creek, which it crosses about thirty chains above the Toll Bridge; the length of the bridge over the creek being four hundred feet and the height above high tide twelve feet. From Rankocus creek the located line is traced to a position above the junction of the two branches of Laurel run; thence crossing the Moorestown and Toll Bridge road, it intersects Pompeston creek at the head of Haines' mill dam; thence to the Swede's Branch run, which it crosses near Worrington's house. Thence west of Lippincott's saw mill to the dividing ridge betwixt the waters of Pensaukin creek and Swede's run on property of I. Lippincott. Thence through the barnyard of I. Lippincott to the eastern branch of Pensaukin creek, crossing it near the tide dam; thence across a neck of land to the West branch, which is crossed below Poplar landing; thence through the Twenty-Mile valley on lands of Burrow, Lawrence and Clements; and through a depression in the ridge dividing the waters of Pensaukin creek and Baldwin's run on land of Merrit Horner, the line is conducted to the Cove Landing road. Thence in a parallel course with the Camden road, and turning a point of a ridge through Carter's land, it is traced to the Burlington road and Baldwin's run, both of which it crosses near Copperthwaite's store. Thence it follows the top of the side hill on Baldwin's run and pierces the dividing ridge between that run and Cooper's creek; thence through lands of ——— Cooper to Cooper's creek; thence over the creek below the present bridge on the Moorestown road;

* The level of the shore line of the route is about four feet above high water, mean tide. It would be advisable here in forming the road to place it between such portions of the side hill as are precipitous and the river, so as not to disturb the high and steep bluff.



thence crossing the Moorestown road, passes through land of ——— Carman to the Kaighn's Point road. Thence following the centre of Bridge street in Camden to the marsh bordering on the Delaware river.

The peculiar nature of the face of the country through which the line of the road is located rendered it necessary in many cases to use high numbers for its graduation. In some instances this might have been avoided by incurring the expense of deeper excavations and higher embankments, but as it was an object with the Company to diminish the cost of the road formation, and bring it within a less expenditure, it was considered by them expedient to adopt such graduations as they deemed best suited to the localities that presented themselves on the route. The table herewith submitted exhibits the graduation of the line as located from South Amboy to Camden.

[The tables which are omitted are in the files of the Section of Transportation and Engineering, U. S. National Museum.]

The map which accompanies this report is delineated by a scale of four inches to a mile. It would have been desirable to have exhibited on the drawing all the lines which have been explored during the course of the survey, but the shortness of the time which has been allotted to accomplish the work would not admit the extension of it for that purpose.* The map, therefore, only illustrated the survey of the located line as described in my report, in addition to which I have, in conformity with the charter of your Company, prepared two books containing the courses and distances of the located line, which are herewith presented. As the completion of the location of the line was only brought to a close a few days ago, we have also had but a short period of time to prepare the other documents illustrative of the operations we have been engaged in. It only remains for the completion of the duty assigned me to present the following approximate estimate † of the road formation:

* The Board of Directors, being anxious to commence the construction of the road at an early period, could not by the terms of their charter accomplish this until a return was made in the proper office of the whole location of the line. In order to fulfill my engagement with the Company, it was necessary that the documents should be completed for that purpose on the 11th of the present month; the location was only finished on the 2d of the month.

† In the estimate of the cost of construction, the embankment in the Deep cut at South Amboy is put down at 12 cents per cubic yard and excavation at 15 cents. In the other portions of the road the cost of embankment varies from 7 to 14 and the cost of excavation from 6 to 11 cents per cubic yard.

The cost of the larger bridges are estimated as follows:

| | |
|---|---|
| Over South river, 200 feet platform | $2,466 00 |
| At Bennett's, 100 feet | 750 00 |
| Over Millstone creek, 60 feet | 1,350 00 |
| " Rocky brook, 60 feet | 1,350 00 |
| " Assapink creek, 60 feet | 1,350 00 |
| " Crosswick's creek | 4,730 00 |
| " Rankocus creek, 400 feet | 5,783 00 |
| " Pensaucon creek | |
| West branch, 110 feet | 2,060 00 |
| East " " " | 1,960 00 |
| " Cooper's creek, 800 feet | 5,914 00 |

SUMMARY.

| | | | | |
|---|---|---|---|---|
| Section No. | 1 = 160 | chains | (South Amboy) | $ 24,046 71 |
| " " | 2 = 160 | " | ..... | 17,519 88 |
| " " | 3 = 120 | " | ..... | 8,923 81 |
| " " | 4 = 180 | " | ..... | 6,462 10 |
| " " | 5 = 180 | " | ..... | 2,293 18 |
| " " | 6 = 160 | " | ..... | 1,865 75 |
| " " | 7 = 150 | " | ..... | 12,392 93 |
| " " | 8 = 130 | " | ..... | 7,805 35 |
| " " | 9 = 184 | " | ..... | 3,338 80 |
| " " | 10 = 160 | " | ..... | 4,883 36 |
| " " | 11 = 140 | " | ..... | 7,119 83 |
| " " | 12 = 164 | " | ..... | 2,247 94 |
| " " | 13 = 140 | " | ..... | 7,306 56 |
| " " | 14 = 160 | " | ..... | 5,644 85 |
| " " | 15 = 190 | " | ..... | 5,730 97 |
| " " | 16 = 174 | " | ..... | 21,070 74 |
| " " | 17 = 180 | " | ..... | 16,854 20 |
| " " | 18 = 290 | " | ..... | 24,216 00 |
| " " | 19 = 180 | " | ..... | 7,544 90 |
| " " | 20 = 140 | " | ..... | 3,176 16 |
| " " | 21 = 180 | " | ..... | 1,764 24 |
| " " | 22 = 164 | " | ..... | 2,981 06 |
| " " | 23 = 140 | " | ..... | 1,634 24 |
| " " | 24 = 140 | " | ..... | 14,045 34 |
| " " | 25 = 140 | " | ..... | 3,691 64 |
| " " | 26 = 180 | " | ..... | 3,437 28 |
| " " | 27 = 108 | " | ..... | 12,031 61 |
| " " | 28 = 120 | " | ..... | 2,547 86 |
| " " | 29 = 160 | " | ..... | 2,975 24 |
| " " | 30 = 196 | " | (Camden)..... | 11,296 30 |
| Grubbing on the whole line..... | | | | 4,250 00 |
| Total cost..... | | | | $251,101 83 |
| Add for superintendence and unforeseen expenses 10 %..... | | | | 25,110 18 |
| | | | | $276,212 01 |

In closing my report on the location of the Camden and Amboy Railroad and my connection with the company, I would wish to do justice to the respective parties who conducted the surveys under the direction of Lieutenant Cook and Mr. J. E. Thomson. The alacrity and zeal with which they coöperated in bringing to a close the different duties assigned them has enabled me to fulfill my engagement with the Board of Directors.

All which is respectfully submitted.

JOHN WILSON,
*Civil Engineer.*

PHILADELPHIA, OCTOBER 11, 1830.



# THE NEW JERSEY RAILROAD AND TRANSPORTATION COMPANY.

[From Gordon's Gazetteer of New Jersey, 1834.]

The New Jersey Railroad and Transportation Company was incorporated by the act of 7th March, 1832, with a capital of $750,000, and the privilege to double it, divided into shares of $50 each; with power to make a railroad not more than 66 feet wide, with as many tracks as they may deem proper, from such point in the city of New Brunswick, as shall be agreed upon by them and the corporation of that city, through or near the villages of Rahway and Woodbridge, within half a mile of the market house, in Elizabethtown, and through Newark, by the most practicable route, and thence contiguous to, or south of the bridges over the Hackensack and Passiac rivers; crossing Bergen Ridge, south of the turnpike road to some convenient point not less than 50 feet from high-water mark, on the Hudson river, opposite to the city of New York; and to make a branch road to any ferry on the Hudson opposite to New York, which shall join the main road within 100 yards of the Hackensack river, if the main road cross that river within 100 yards of the present bridge; but if more than 100 yards from that bridge, then the branch to join it at such point, west of the river, as shall best give to the ferries equal facilities of communication with Newark. And if the company do not construct such branch as soon as the main road from Newark to the Hudson shall be made, then the law authorizes the owner of the ferry so to do, with the same power and liabilities as the company. The act also empowers the company to regulate the time and manner of transporting goods and passengers, the description and formation of carriages, and the rates and modes of collecting toll within the following limits: viz., for empty carriages weighing less than a ton, two cents; more than one and less than two tons, four cents; above three tons, eight cents per mile; and, in addition thereto, six cents per ton for goods and three cents for each passenger per mile: Provided, that no farmer of the State shall pay toll for carrying the produce of his farm, in his own wagon, not weighing more than a ton, when such produce does not weigh more than 1,000 lbs., but shall pay only for carriages, as if empty. It also authorizes the company to construct branches to any landing on or near the Passaic, not north of Belleville, and to any place in the township of Newark; and requires them to commence the road at Jersey City and New Brunswick within one year and to complete the whole route in five years, under penalty of forfeiture of their charter. The company are further empowered to purchase any turnpike road and bridges on the route; but the act reserves to the State and individual stockholders of the Newark Turnpike Company the right, at any time within two years from the opening of the books, to take stock of the company in exchange, or to sell to the company, at market value; but the Newark turnpike and the bridges over the Raritan, Passaic and Hackensack are to be kept as public roads, without obstruction; to build or purchase carriages for the transportation of persons or property; but not to charge more than six cents a mile for transporting passengers and each ton of goods, nor more than $1.25 for carrying passengers from New York to New Brunswick; to hold real estate at the commencement and termination of their roads not exceeding three acres at each place; and to build

thereon warehouses, stables, machine shops, etc., and over the Hackensack and Passaic rivers such bridges, piers, etc., as may be necessary. The State has reserved the right to purchase the road after the expiration of the charter (30 years) and of subscribing one-fourth of the stock, and has imposed an annual tax of ¼ per cent. upon the capital paid in; and should the road be continued across the State, a transit duty of eight cents for each passenger and 12 cents for every ton of goods transported over the whole road. By a supplement to the act relative to the Delaware and Raritan Canal and Amboy Railroad, the companies are required to construct a lateral railroad from the village of Spottswood to the city of New Brunswick, as soon as a railroad shall be made from New Brunswick to the Hudson river; consequently, when the Camden and Amboy Railroad and the New Jersey Railroad shall be completed, there must be a railroad through the State from Jersey City to Philadelphia.

The New Jersey Railroad Company commenced operations in the summer of 1832, and have confident expectations of completing the road from Hackensack river through Newark to Elizabethtown, by the fall of 1833; and from the Hudson to Elizabethtown in the summer of 1834; and the whole line, from the Hudson to New Brunswick, within two years. The estimated cost of the whole road for one track, with suitable passing places, including the purchase from the Bridge and Newark Turnpike Companies, the bridges over the Hackensack, Passaic and Raritan, and the moving power, cars, etc., as per report of N. Beach, the engineer, is..... $718,912

Cost of superstructure for a second track on the whole line, 30 miles, at $4,710.80 per mile..... 141,324

Total..... $860,236

Upon this capital the company, after paying for annual repairs, cost of moving power, cars, etc., the sum of $35,640 per annum, anticipate to receive a profit of $134,775, equal to 15½ per cent.

By an arrangement with the Patterson Railroad Company, the road for both companies, from the west side of Bergen Ridge through the Deep Cut, and across the heavy embankments, on the east of the Ridge and to the Hudson river, is to be constructed under the charter of this company as joint property of the two companies, the Patterson company paying two-fifths and this company three-fifths of the expense of construction, each company using the road without accounting to the other. This arrangement reduces the expense of the New Jersey Company $55,171.

The company, in order to avoid litigation, has purchased of the United Passaic and Hackensack Bridge Companies their stock at $150,000, equal to $150 per share, upon which amount it had for some years paid seven per cent. and created a surplus fund of $30,000. With this stock they obtained also all the right which the bridge company possessed to pass the Passaic and Hackensack rivers, by bridges, for sixty years to come. A very large majority of the stockholders of the bridge companies used the right of election stipulated for, to take railroad stock, and have thus become identified in interest with the company.



## THE PHILADELPHIA AND TRENTON RAILROAD COMPANY.

The Legislature of Pennsylvania, by act approved February 23, 1832, empowered the Philadelphia and Trenton Railroad Company, as soon as they can conveniently, to locate and construct a railroad of one or more tracks from a suitable point in the district of Kensington (Philadelphia) through the borough of Frankford, intersecting the Delaware Division of the Pennsylvania Canal in the borough of Bristol, and continuing to a point at or near the Trenton-Delaware bridge, in the borough of Morrisville, and to make, construct and erect such warehouses, toll-houses, carriages, cars, and all other works and appendages necessary for the convenience of the said company in the use of the said railroad: *Provided*, that the said company shall not be allowed to construct said railroad until the board of canal commissioners of Pennsylvania shall examine the location and be of opinion that the route of the said railroad will not interfere with the most eligible route for a canal from Bristol to the city of Philadelphia: *Provided*, That the said company shall not be allowed to locate said railroad on any turnpike road or public street now constructed or laid out, to a greater extent than may be necessary in crossing the same, or to enable the said railroad to be carried to the Trenton-Delaware bridge, and shall be compelled to take the north side of the Bristol turnpike road if the ground is preferable: *Provided also*, That the said company shall not be allowed to approach within three hundred feet of said bridge with any locomotive or other steam-engine, without the consent of the said bridge company thereto. (Sec. 8.)

That the said railroad shall be constructed by the said company as not to obstruct or impede the free use and passage of any public road or roads which may cross or enter at the same, being now laid out or hereafter to be laid out; and in all places where the said railroad may cross, or in any way interfere with any public road, it shall be the duty of the said company to make or cause to be made, a good and sufficient bridge, causeway or causeways, to enable all persons passing or traveling such public road to cross and pass over or under the said railway, which bridge, causeway or causeways shall be made and maintained by the said company; and if the said company shall refuse or neglect to make such bridge, causeway or causeways, or, when made, to keep the same in good repair, they shall be liable to pay a penalty of ten dollars for every day the same shall be neglected or refused to be made or repaired, to be recovered by the supervisor of the township, or the officers of any incorporated company, with costs, for the use of the township or company, as debts of like amount are by law recoverable, and shall, moreover, be liable to an action or actions at the suit of any person who may be aggrieved thereby, and the service of process upon any officer or agent of said company shall be as good and available in law as if served upon the

president thereof: *Provided*, That no obstruction whatever shall be placed on or across any stream, now declared a public highway, so as to impede or interfere with the full and free navigation thereof, or to change the direction of any stream or water-course, not declared a public highway, so as to affect the rights and interests of the owners thereof, without the consent of the said owners, unless the right to the same be obtained by such process as is before directed in relation to other private property; and that any inconvenience or expense attending the alteration of vessels now navigating said streams to conform to the bridges erected by said company shall be paid out of the funds of the company. (Sec. 11.)

That on the completion of the said railroad, or any portion thereof, not less than ten miles, the same shall be esteemed a public highway for the conveyance of passengers and transportation of merchandise and commodities, under such regulations as shall be prescribed by the directors; and it shall and may be lawful for the said company to demand and receive such sum or sums of money for tolls, of persons and property, as they shall from time to time think reasonable: *Provided*, That the toll on any species of property shall not exceed five cents per ton per mile, nor upon passengers more than three cents each per mile; and it shall be further lawful for the president and directors of the said company to prescribe the kind of carriages, wagons, and conveyances which shall be used on the said railroad for the transportation of persons and commodities, and to adopt such regulations as to the transit of wagons and carriages on the said road as may seem to them most conducive to the interests of the public and of persons using the same. (Sec. 13.)

That the president and directors shall have full power to purchase with the funds of the said company, and place on the said railroad, all machines, wagons, vehicles, carriages, and teams of any kind whatsoever, which they may deem necessary and proper for the purposes of transportation; and that they may also, to any extent which they may deem advisable, transport all goods, wares, minerals, and merchandise, or other articles which may be offered them for transportation, and all passengers wishing to be conveyed on their railroad; and the said president and directors may charge for toll and freight on all articles and for all passengers so conveyed by them, their officers and agents, not exceeding twice the rates granted in the preceding section of this act for tolls alone: *Provided*, That if the said machines, wagons, vehicles, carriages, and teams shall be so used on the said railroad as to prevent or render unsafe the traveling upon any canal or public road now constructed or laid out on or near the line of the said railroad, the Legislature may order and direct such rules and regulations for the said machines, wagons, vehicles, carriages, and teams as will secure such traveling safe and uninterrupted; and if such traveling shall be unsafe or interrupted, the courts of quarter sessions of the respective counties through which the railroad shall pass, may order and direct such rules and regulations until the Legislature shall have acted thereupon. (Sec. 14.)



## THE TRENTON BRIDGE CO.

The president, managers and company for erecting a bridge over the river Delaware, at or near Trenton, were incorporated by an act of the Legislature of New Jersey, passed March 3, 1798, with authority to construct a bridge across the Delaware river at or near Trenton; the bridge was to be completed in seven years, and the act was not to be operative until the Legislature of Pennsylvania should pass a similar act: an act passed February 26, 1801, provided that, after the expiration of fifteen years from the completion of the bridge, the States of New Jersey and Pennsylvania, or either, could purchase the works at an appraisement, but this act was repealed February 17, 1804: an act passed December 3, 1804, extended the time for the completion of the bridge to March 3, 1812: in 1839 the bridge was partially rebuilt to carry locomotives over a single track so that passengers could be transported through to Jersey City without changing cars. An act approved March 10, 1868, authorized the widening of the bridge and the placing thereon of additional railroad tracks: an act of the Legislature of Pennsylvania, passed April 4, 1798, incorporated the company with like authority to that conferred by the act passed by the New Jersey Legislature, March 3, 1798: an act approved April 2, 1804, extended the time for the completion of the bridge for four years: an act approved March 3, 1868, authorized the widening of the bridge and the placing thereon of additional railroad tracks; on June 20, 1877, a contract was executed with the Philadelphia and Trenton Railroad Company, granting to that Company the use of the railroad tracks upon the southern portion of the bridge, for the term ending December 1, 2870, and this contract was assigned June 20, 1877, to the Pennsylvania Railroad Company.

## THE ASSOCIATES OF THE NEW JERSEY COMPANY.

The Associates of the New Jersey Company were incorporated by an act passed November 10, 1804, the preamble to which recited, "That Richard Varick, Jacob Radcliff and Anthony Dey have become the proprietors, by purchase from Cornelius Van Vorst, of all that certain tract or parcel of land and meadow, situate, lying and being in the township of Bergen, county of Bergen and State of New Jersey, commonly called Powles' Hook, bounded on the east by the Hudson river, on the north by said river or the bay commonly called Harsimus bay; on the south by said river or the bay commonly called Communipaw bay, and on the west by a line drawn from a stake standing on the west side of the small creek, on the southwest side of said track (from which stake the flagstaff on Ellis' island bears south one degree twenty minutes east, and from which the chimney of the house of Stephen Vreeland, on Kaywan, bears south fifty-six degrees ten minutes west, and from which the steeple of the Bergen church bears north fifty degrees twenty-five minutes west), north twenty-six degrees thirty minutes east to Harsimus bay aforesaid; together with the right of ferry from the said tract or parcel of land across Hudson river and elsewhere, and the right and title of said Cornelius Van Vorst, under the water of the Hudson river and the bays aforesaid, opposite the said premises, as far as the right of said Cornelius Van Vorst extends"; authority was given to hold the said tract and premises, with the privileges and appurtenances described in the said preamble, and the same to grant, demise, alien or dispose of at pleasure, and to lay out streets and erect docks, wharves, or piers on the said river and the bays thereof. Under date of February 16, 1877, the company executed a lease including certain of its property, water-front privileges, terminal facilities, ferry rights, franchises, and privileges at Jersey City, for the term of nine hundred and ninety-five years from June 30, 1875, to the United New Jersey Railroad and Canal Company, and such lease was assigned under date of February 16, 1877, to the Pennsylvania Railroad Company.

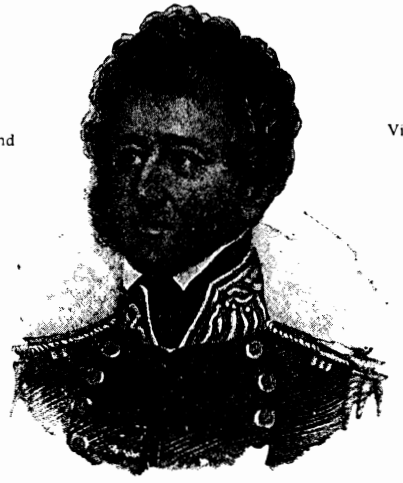
ROBERT L. STEVENS,
President and Chief Engineer Camden and Amboy Railroad.

EDWIN A. STEVENS,
Manager Camden and Amboy Railroad.

JOHN STEVENS,
Inventor. Statesman.

JOHN S. DARCY,
President New Jersey Railroad and Transportation Co.

JOHN P. JACKSON,
Vice-President and Gen. Superintendent New Jersey Railroad and Transportation Co.



COMMODORE ROBERT F. STOCKTON,
President Delaware and Raritan Canal Company.

# BIOGRAPHICAL SKETCHES.

## JOHN STEVENS AND HIS SONS.*

### EARLY AMERICAN ENGINEERS.

Biographies are too often eulogies. Yet it seems impossible to trace the career of John Stevens and of his sons (Robert Livingston and Edwin Augustus) without, apparently at least, joining the ranks of the hero worshippers—for I know of no other instance where a father and his sons have left behind them such a remarkable record of usefulness.

### JOHN STEVENS.

John Stevens, the father, who was among the greatest engineers and naval architects living at the end of the last century, was born in New York of English lineage in 1749. He was graduated at King's College (now Columbia) 1768: was admitted to the New York bar in 1771: was treasurer of New Jersey during the active period of the Revolutionary War: and in the succeeding sixty years resided in New York and on his estate in Hoboken.

"Throughout this long period he labored continuously for the introduction and application of steam to navigation and to railroad locomotion."

John Stevens' attention was first attracted to steam-boat navigation while driving along the banks of the Delaware River near Burlington, N. J., when he saw in 1787, John Fitch's steam-boat pass up the river against the tide. His interest was so much excited that he followed the boat to its landing, where he examined the engines and the mechanism of the pushing paddles carefully. "From that hour he became a thoroughly excited and unwearied experimenter in the application of steam to locomotion." It was in this year that the Legislature of New York granted to Fitch the exclusive right to navigate the waters of that State with steam propelled vessels.

It was on the petition of John Stevens that the patent law of 10th April, 1790—the foundation of the American patent system—was framed. (See Journal of House of Representatives, p. 30.)

"In 1792, he took out patents for propelling vessels by steam-pumps, modified from the original steam-pumps of Savary. He made many experiments on different modes of propulsion by steam, having as his associates the elder Brunel, constructer of the Thames Tunnel, Chancellor Robert L. Livingston, his brother-in-law, and Nicholas J. Roosevelt. In 1798 he constructed a steam-boat that navigated the Hudson.

"He made the first practical application of steam to the screw-propeller in 1804; and although the screw-propeller did not come into use until thirty-five years afterwards, his engine and screw, which are still preserved, show the correctness of his ideas, as well as the imperfection of the workmanship of that period that prevented commercial success. His short four-bladed screw has survived many forms afterwards tried.

"He patented the multi-tubular boiler in the United States, 1803; in England, 1805; established the first steam ferry in the world, between New York and Hoboken, October 11, 1811, with the 'Juliana.' (See Valentine's Annals of the City of New York).

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* Paper read before the Philosophical Society of Washington, by J. Elfreth Watkins, C E., May 7, 1892.

[NOTE.—The Author desires to acknowledge his indebtedness to Francis B. Stevens, D. Eng., of Hoboken, N. J., without whose valuable assistance this paper would not have been written.]

"In 1812 (five years before the commencement of work on the Erie Canal) he addressed a memoir to the New York State Commission, urging the immediate construction of a railroad instead of a canal. This memoir with the adverse report of the Commissioners (De Witt Clinton, Gouverneur Morris, and Chancellor Livingston), was published at the time. At the date of this memoir, although railroads for carrying coal had been in use in England for upwards of two hundred years, there was not a steam locomotive or passenger car in use in the world. His plans and estimates were definite, and after the introduction of railroads their accuracy was proven.*

This pamphlet, which was entitled "Documents Tending to Prove the Superior Advantages of Railways and Steam Carriages over Canal Navigation," entitled him, even if he had failed, as he did not, in the field of invention, to be held in grateful remembrance by his countrymen for his broad and statesmanlike views, keen perception, ardent patriotism, and a demonstration that was prophetic in its accuracy.

In 1813 John Stevens designed an iron clad vessel with a "saucer-shaped" hull which was to be plated with iron and to carry a heavy battery. This vessel was designed to be secured to a swivel which was to be held in position by an anchor in the channel of the stream to be defended. Screw-propellers driven by steam engines were to be placed beneath the vessel (in order that they would be safe from injury by shot), and connected with the machinery which was arranged to cause the vessel to be rapidly revolved about the swivel in its centre. Each gun was to be fired as it was brought into line and was to be reloaded before it came around again. This was an early embodiment of the "monitor" principle. It was the first iron-clad ever designed.

The South Carolina Railroad (commenced in 1829) which when completed in 1832 was the longest railway in the world, was constructed upon his plans as laid down twenty years before.

Before 1812, in connection with his son Robert, he had made steam-boat navigation on the Delaware a commercial success. Shortly afterward he became connected with the famous Union Line, which controlled the transportation of merchandise and passengers between Philadelphia and New York for many years.

Colonel Stevens was anxious to put his recommendations of 1812 into practice. In 1815 he obtained a charter from the State of New Jersey "to build a railroad from the the River Delaware, near Trenton, to the River Raritan, near New Brunswick." This was undoubtedly the earliest railroad charter granted in America; but no tangible result followed, because the scheme was regarded as wild and visionary. The introduction of the steam-boat, coupled with the success of the Duke of Bridgewater in the introduction of canals abroad, had made them more popular with capitalists than the untried railroad, and no money could be raised for that undertaking.

### FIRST CHARTER OF THE PENNSYLVANIA RAILROAD.

His interest in the subject of internal communication did not flag on account of this failure, for in 1823, through his exertion, acts were passed by the Legislature of Pennsylvania for the incorporation of "The President, Directors and Company of the Pennsylvania Railroad Company" "to make, erect and establish a railroad on the route laid out (from Philadelphia to Columbia, in Lancaster county,) to be constructed on the plan and under the superintendence and direction of the said John Stevens" † Among the incorporators were Stephen Girard and Horace Binney.

* Quotations in this and the preceding paragraphs are from the inscription on the Medallion Portrait of John Stevens in the U. S. National Museum, Washington.

† See Sec. 6, p. 252, Laws of Pennsylvania 1823.



Three years later (1826) Colonel Stevens, then seventy-six years old, constructed at his own expense, a locomotive with a multi-tubular boiler, which he operated for several years on a circular track on his estate at Hoboken, carrying half a dozen people at a speed of over 12 miles an hour. A model of this locomotive together with the original multi-tubular boiler which formed a part of it, is preserved in the U. S. National Museum. This was the first locomotive in America driven by steam upon a track of which there is reliable record.

He died March 6, 1838, aged 89 years. He saw the first steam engine erected on the Western Continent, at Belleville, N. J. During his lifetime Watt perfected the stationary low pressure condensing steam engine. Within his memory the Duke of Bridgewater inaugurated the canal system of Great Britain: Trevithick developed the high pressure steam engine into a commercial success and successfully applied it to the locomotive: Nelson won the Naval battle of Trafalgar: Fulton introduced steam navigation on the Hudson—steam-boats began to ply on the Mississippi and the Lakes: Captain Rogers made the first experimental steam voyage across the Atlantic with the "Savannah:" Steam was introduced into all the principal navies of the world: George and Robert Stephenson made their fame as locomotive constructors, and the railway systems at home and abroad were organized. Seven years before his death the locomotive was put upon the Camden and Amboy Railway connecting New York and Philadelphia, and on the first links of the Pennsylvania Railroad, in advocating the construction of both of which railroads he took an active part twenty years before. On the day of his death the "Great Western" lay in the Thames receiving her finishing touches preparatory to making the initial voyage of the pioneer Trans-Atlantic steamship line between England and New York.

He was the copatriot of Washington—during the New Jersey campaigns: the correspondent of Barlow and Franklin: Chancellor Livingston (after whom his second son was named) was his brother-in-law: and although he was the rival of Fulton in introducing the steam-boat in America, they had been warm friends for several years before the latter's death in 1815.

Charles King, President of the Columbia College, writing of him in 1852 says: "Born to affluence, his whole life was devoted to experiments, at his own cost, for the common good. He was a thoroughly excited and an unwearied experimenter in the application of steam to locomotion on the water, and subsequently on the land. Time has vindicated his claim to the character of a far-seeing, accurate, and skillful practical experimentalist and inventor. The thinker was ahead of his age."

The careers of the sons are closely interwoven with his.

### ROBERT LIVINGSTON STEVENS.

Robert Livingston Stevens was born October 18, 1787. In 1804 he assisted his father in the construction of the first twin screw steamboat, being then only seventeen years old. He took the "Phœnix" from New York to Philadelphia by sea in June, 1808. The "Phœnix" was the first steam-boat to navigate the ocean. At the death of Fulton, 1815, the speed of steam-boats on the Hudson was under 7 miles an hour. The "Philadelphia", built by Robert L. Stevens, had a speed of 8 miles. He succeeded in increasing the speed of each successive steam-boat of the many that he built until in 1832 the "North America", the finest boat of her time, attained 15 miles. For 25 years after 1815 he stood at the head of his profession as a constructer of steam-vessels. In 1821 he originated the form of ferry-boats and ferry-slips, now in general use, constructing the ferry-slips with spring piling and fenders. In 1818 he invented the cam board cut off, and applied it to the steam-boat Philadelphia, on the Delaware: this being the first application of the expansive action of

steam to navigation..—In 1821 he adopted the working (or walking beam) and improved it by making it of wrought iron strap with a cast iron centre: in 1829 he adopted the shape now universally used in this country He invented the split water wheel in 1826, and in 1831 the balance-valve, which is now always used on the beam engine. He first placed the boilers on the wheel-guards over the water: he adopted the Steven's cut off, and finally left the American working beam (or walking beam) engine in its present form. Beginning with a pressure of 2 pounds to the square inch he increased the strength of his boilers until 50 pounds could be safely carried. He made the first marine tubular boiler in 1831. He reduced the vibration of the hull and added greatly to the strength by the overhead truss frame of masts and rods now used.

Early in October, 1830, and shortly after the surveys of the Camden and Amboy Railroad were completed, Robert L. Stevens, who was President and Chief Engineer of that road, sailed for England to order a locomotive and iron rails. At that time no rolling mill in America could roll T rails.

Robert Stevens advocated the use of an all iron rail in preference to the wooden rail or stone stringer plated with strap iron, then in use on one or two short American railroads. At his suggestion the Board of Directors of the Camden and Amboy railroad passed a special resolution authorizing him to obtain the rails he advocated.

During the voyage to Liverpool he whiled away the hours on shipboard by whittling thin wood into shapes of imaginary rail-sections until he finally decided which one was best suited to the needs of the new road.

He was familiar with the Birkenshaw rail with which the best English roads were then being laid, but he saw that, as it required an expensive chair to hold it in place, it was not adapted to our Country, where metal workers were scarce and iron was dear. He added the base to the T rail, (see plate—fac-simile of Specification—Nov. 26, 1830) dispensing with the chair. He also designed the "hook-headed" spike(which is substantially the railroad spike of to-day) and the "iron tongue", (which has been developed into the fish-bar), and the bolts and nuts to complete the joint.

Mr. Stevens neglected to obtain a patent for these inventions, although urged to do so by Mr. F. B. Ogden, American Consul at Liverpool, and the credit of being the inventor of the American Rail was for a time claimed for others, but the evidence * brought forward in late years fully establishes the fact that he was the originator of the American system of railway construction. The "Stevens rail" gradually found favor in America—all roads being relaid with it as the original T or strap rail became worn out.

Sixty years have elapsed since this rail was adopted by the Camden and Amboy Company, and with the exception of slight alterations in the proportions incident to increased weight, no radical change has been made in the "Stevens rail," which is now in use on every railroad in America. Many improvements have been made in the joint fixture but the "tongue" or fish plate improved into the angle splice bar is in general use, and nothing has yet been found to take the place of the "hook-headed" railroad spike which Robert Stevens then designed.

Mr. Stevens divided his time while abroad between arranging for the manufacture of track material and examining the English locomotives that were being constructed or had been in service.

* On July 16, 1831 Mr. Ogden wrote Mr. Stevens from Liverpool as follows:
"The price of iron remains about the same as when you were here and I do not think there would be much difference in any future contract. It would make considerable however if you would have the rails of unequal lengths, say from 10 to 16 feet, and it appears to me to be of little importance that the joints shonld always be opposite to each other. Vignoles has laid dowa his road in that way, the rail remarkably well executed on *your pattern*. (like the pieces I sent out to you) but made lighter and is very much pleased with it and says it is decidedly the best rail in use."



A year had elapsed since the opening of the Liverpool and Manchester Railway, and the English mechanics had not been idle. The "Rocket," although successful in the Rainhill contest, when put to work had shown many defects that Stephenson & Co. were striving to correct in subsequent locomotives.

The "Planet," built by that firm, was first tried in public December 4, 1830, shortly after Mr. Stevens arrived in England, and at that time was undoubtedly the best locomotive in the world.

Mr. Stevens was present at a trial when the "Planet" showed most satisfactory properties. and he at once ordered a locomotive of similar construction, from the same manufacturers. This locomotive called the "John Bull," put in service in 1831, is the prototype of the locomotive now in general use. It is now preserved at the U. S. National Museum.

Toward the close of the War of 1812 Robert L. Stevens was engaged in making a bomb that could be fired from a cannon instead of from a mortar, in order that it might be applied to naval warfare. * He succeeded in producing a successful percussion shell, which was adopted by the U. S. Government who purchased a large quantity together with the secret of its construction.

In 1850 he designed and built the "Maria," the fastest sailing vesssel of her day. This was the yacht that defeated the "America" in New York harbor a few months before the lattter won the memorable race on the "Solent." It was in this race that her Majesty Queen Victoria, when she asked her favorite skipper who was first and second in the race received for a reply "The 'America' leads, there is no second."

Many years before the laws governing the variation of resistance of vessels driven at excessive speeds were generally understood Robert L. Stevens had not only arrived at a knowledge of them but had put into practice those forms of least resistance—the graceful water lines which now distinguish the practice of the modern naval architects.

He died at Hoboken April 20, 1856.

Robert L. Stevens will be remembered as the greatest American mechanical engineer of his day—a most intelligent naval architect—to whom the World is indebted for the commencement of the mightiest revolution in the methods of modern naval warfare.

## EDWIN AGUSTUS STEVENS.

Edwin A. Stevens, the seventh son of Col. John Stevens, was born at Castle Point, Hoboken, July 28th, 1795.

He received his engineering education from his father, and from his brother Robert L., his senior by eight years, and with whom he was associated in business partnership from his early manhood. On this account the individual work of the two brothers cannot always be separated, but it may be said that while both were men of great capacity as engineers and business men, the elder took the lead as an engineer, and the younger as a business man.

The laborious and useful life of Edwin A. Stevens was occupied in the life-long management of his father's estate, on which the City of Hoboken now stands: in the organization, construction and operation of the Camden and Amboy Railroad, of which he was the active business manager: in making improvements in steam navigation: in the great part taken by him in the introduction of iron armor on ships of war: and in devising methods of attack and defence for iron clads.

At the age of twenty-five, by a family agreement, he was made trustee of the greater portion of his father's estate, including what was then the

* As it is impossible to separate the individual labors of the brothers upon armored ships, this portion of their biographies is appended under "The Joint Work of Robert L. and Edwin A. Stevens in the introduction of Armor on Ships of War."

island, but which has since become the City of Hoboken, thus relieving his father, then seventy years of age, of the burden of his business cares. He remained at Hoboken until he was about thirty, taking care of the estate and assisting both his father and his brother, Robert, in their engineering labors. During that period he invented and patented the Stevens' plough, which was much liked and extensively used for years. This gave him an extended acquaintance among the land owners of New Jersey that lasted for many years.

In the latter part of the year 1825, at the age of thirty, he took charge of the Union Line, which then carried nearly all the passengers and freight between New York and Philadelphia. The Union Line was organized in 1820, and it consisted of steam-boats on the Raritan and Delaware, and of coaches on the turnpike between Trenton and New Brunswick. And after the year 1827, it was chiefly owned by the brothers Robert L., Edwin A. and John C. Stevens, Edwin remaining its business manager until it was merged into the Camden and Amboy Railroad in 1832. The coaching of the Union Line surpassed anything of the kind ever known in the United States. Long trains of four horse coaches, at times amounting to thirty or forty daily awaited in line, the arrival of the steam-boats at each end of the turnpike, and were then drawn rapidly, frequently on a gallop across the state. The coaches were lighter than the English coach; they were limited to ten passengers each, and many of the horses were thoroughbred.

The Camden and Amboy Railroad was chartered in 1830, when Robert L. Stevens was made President and Engineer, and his brother Edwin, Treasurer and Manager; and the great business capacity of the latter was then shown by the speedy organization of the company and the construction of the road. He gathered around him as associates in the company the ablest lawyers of the state, by which means a timely settlement was made of the legal questions raised against privileges necessary for a railroad, but antagonistic to what was then considered the common law of highways. And he selected for the work to be done, the best available business men, mechanics and contractors: the result being the incredibly short time in which the legal objections were met, the right of way secured and the road built and put in operation.

He remained the business manager of the Camden and Amboy Railroad for upwards of thirty-five years, during which time the stock constantly appreciated in value, and no dividend was passed.

It was within this period that the American railroad system was developed, differing very materially from that simultaneously developed in England, and on the Continent of Europe—First; in the adoption of means of running safely on tracks not inclosed. Secondly; in the alteration of the form of passenger coaches, so as to have intercommunication between them. Thirdly; in the greater simplicity and hardihood of the locomotive. Fourthly; in the increased weight and strength of the rolling stock. And Fifthly; in a better system of carrying both passengers and freight.

In the developement of this American system Robert and Edwin Stevens were prominent. As engineers they invented and constructed many of the countless appliances found necessary; and as business men they adopted those introduced on other railroads.

During the time when his sons were being educated, Colonel Stevens resided in the Summer at Castle Point, Hoboken, and they were obliged to cross the Hudson to school and college by sail or row boats, then the only means of transit. This early experience on the water added to and directed the interest they took in after life in the improvement in steam navigation, and it also led to their becoming devoted yachtmen. Edwin was in his boyhood, when his brother Robert made his early improvements in steam navigation, but after he grew up he greatly assisted his brother. The most notable of his individual improvements was the air-



tight fire room, patented by him April, 1842, (No. 2,524,) and now in use in all the navies of the world.

He died in Paris, France, in 1868.

By his will he endowed the Stevens Institute, Hoboken: the earliest, or among the earliest, of the technological colleges that have proved so useful.

## JOINT WORK OF ROBERT L. AND EDWIN A. STEVENS IN THE INTRODUCTION OF ARMOR ON SHIPS OF WAR.

In the year 1814, and towards the close of our last war with Great Britain, Colonel Stevens had projected the circular iron fort moved by steam, previously alluded to, for the harbor of New York, and by his direction his son Edwin, then nineteen years of age, experimented with a six pounder bronze cannon fired against iron plating. This cannon is still retained at Castle Point. Iron armor, for the protection of the person, has been in use from prehistoric ages, but the demonstration that it could be applied to ships of war was made for the first time by Edwin A. Stevens in 1841, twenty-seven years after he had made the experiments for his father, and at the time when we were on the very brink of war with Great Britain, on account of aggressions on our Canadian frontier. As thick armor plate could not be made at that date, he devised a method of armor plating in laminæ, or of plates laid over each other and riveted. He then made a series of experiments to determine the thickness of plating required to resist the different sizes of balls then in use. From these experiments which were made at Bordentown, New Jersey, in the Summer of 1841, he made the deduction that a target of iron 4½ inches thick, would resist a 64 pound shot, at that time the heaviest ball used in our navy. With the assistance of his brother John C., (his brother Robert being then in Europe) he laid the results of his experiments before President Tyler. As the whole country was then aroused, the President immediately appointed a joint board composed of the ablest ordnance officers of the army, and of the leading officers of the navy to superintend the experiments of the Messrs. Stevens, on iron as a protection for war vessels, and in compliance with the request of this joint board John C. and Edwin A. Stevens wrote them a letter giving their views upon the subject of steamers for coast and harbor defense, stating that their ideas were principally derived from their brother Robert L. Stevens, then abroad. This letter, written August 13th, 1841, and before the application of the screw to vessels of war, can be said to embody the leading principles of naval warfare that have since been reduced to practice.

The army officers were Colonels Totten, Thayer and Talcott, and the naval ones Commodores Stewart, Perry and Smith. The targets 4½ inches thick made by Edwin A. Stevens were tested at Sandy Hook by the joint board of officers in the months of September, October and November, 1841. They made an elaborate report, unanimously agreeing that the targets fully withstood the numerous shots from the heaviest guns then in the service. It was upon the presentation of this report by the Naval Committees of the Senate and the House of Representatives that the act of Congress was passed, authorizing the Secretary of the Navy to contract with Robert L. Stevens, who had then just returned from Europe, for an iron clad steamer,, to be "shot and shell proof." The Act is as follows:

Chapter XII, (statutes of the United States at Large) April 14th, 1842, An Act authorizing the construction of a steamer for harbor defense.

Be it enacted by the Senate and House of Representatives of the United States of America, that the Secretary of the Navy is hereby authorized to enter into contract with Robert L. Stevens for the construction of a war steamer, shot and shell proof, to be built principally of iron, upon the plan of said Stevens. Provided, the whole cost, including hull, armament, engines, boilers, and equipment, in all respects com-

plete for service, shall not exceed the average cost of the steamers Missouri and Mississippi, and be it further enacted, that two hundred and fifty thousand dollars ($250,000), be, and the same is hereby appropriated out of any money in the Treasury not otherwise appropriated toward carrying this law into effect.

(Approved by the President of the United States) JOHN TYLER.

It may be mentioned that this bill was reported from the Committee of the whole of the House of Representatives, April 7th, 1842, at the suggestion of Ex-President John Quincy Adams, then a member of the House, who characterized it as "One of pressing emergency." It passed the Senate unanimously, and in the House there were but thirteen dissenting votes.

Upon the passage of the Act, Robert, with the assistance of his brother Edwin, commenced immediately to plan and construct the vessel. He built a dry-dock for it at Hoboken, and proceeded rapidly with the work.

At the date of the passage of this Act of Congress there had been but little change in the power of guns from those used by Nelson at the battle of Trafalgar in 1805, or on our frigates in the war of 1812. But when Commmodore R. F. Stockton after the failure of his first gun, February 28th, 1844, succeeded in having constructed in England, a wrought iron gun throwing a round shot, that pierced a target 4½ inches thick, Robert Stevens altered his plans, increasing the thickness of the armor, and the size of the vessel that he had contracted to build "shot and shell proof," and then began in the great navies of the World, the long drawn out battle between gun and armor, a contest that by the intervention of other methods, may never be decided. When more powerful guns were introduced, either at home or abroad, other alterations were made thus causing interminable interruptions of the work, many long delays, and an increase of expenditures far beyond that provided for by the Act of Congress. Dying in 1856, five years before our Civil War, he left the vessel unfinished in the basin at Hoboken, but with all the plating on and with the twin-screw engines and the boilers, having 876 square feet of grate surface, in their positions.

This vessel was 410 feet long, 45 feet beam inside of the armor shelf, with the deck two feet above the water, and was similar in these respects to the Monitor class of vessels built six years afterwards by Ericsson, but differing in having a square and immovable turret, instead of a circular and movable one.

During the Crimean War, in 1855, the French Government built three small vessels protected by thin armor, this being the first use of iron clads in foreign naval warfare.

It is significant that on the "Warrior," the first English iron clad, and on the French Frigate "Gloire," both built in 1860, eighteen years after the demonstration of Edwin A. Stevens at Sandy Hook, and on the "Monitor," built in 1862, the thickness of the armor adopted was that of his targets: namely, four and a-half inches

At the commencement of our Civil War, and twenty years after his demonstration at Sandy Hook that a vessel could be protected by iron armor, Edwin Stevens presented to the Government a plan for completing the "Stevens Battery" (which had been bequeathed to him by his brother Robert,) together with a small vessel called the "Naugatuck," to demonstrate the practicability of his plans. This small vessel was accepted by the Government and was one of the fleet that attacked the "Merrimac." She was a twin-screw vessel, capable of being immersed 3 feet below her load line, so as to be nearly invisible, and of being raised again in 8 minutes by pumping out the immersing weight of the water, and of turning end for end on her centre in one minute and a quarter. As the plans for the modificatiou of the Stevens Battery embodied ideas then novel, but which have since been found practicable and



necessary, his offer was rejected by the Government. The "Stevens Battery" remained in the same state in which it was left at the death of Robert, in 1856, until after the death of Edwin, in 1868. The latter bequeathed it to the State of New Jersey, together with one million dollars for its completion. This money was spent in 1869 and 1870. The vessel was never launched, and in 1881 was taken to pieces and sold for old material.

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It may be truly said that through the labors of John Stevens and his sons in the field of experimental mechanics they were able to determine important engineering constants, of incalculable value to the marine, civil and military engineer.

Their greatest achievement was to obtain definite information relating to the economics of engineering in the broadest sense.

Familiar with the theory of machines, as understood in their day, they were untiring in the practical demonstration of the problems presented to their attention.

The laws which they investigated and the facts they placed upon record are now so well understood that few know, or remember, that it is to the Stevenses that we are indebted for the most valuable data used in modern practice by the engineer of to-day.

It is to be regretted that no comprehensive biography of the Stevens family is accessible to the student of engineering history.

## JOHN S. DARCY.

General John S. Darcy was born in Hanover, Morris County, New Jersey, on Feb. 24th 1788. He was the son of Dr. John Darcy who was the leading physician of that vicinity and had been a surgeon in the Revolutionary War. In early life he represented his native county in the New Jersey Legislature and was appointed United States Marshal by Gen. Jackson.

He continued to hold the position during Mr. Van Buren's administration and superintended the census of 1844. While he was Marshal he took an active part in the suppression of the smugglers on the New Jersey Coast. In 1832, he removed to Newark N. J., where he soon became one of the leading physicians. He also became largely identified with railroad matters especially in the N. J. Railroad and Transportation Company. His practice which was perhaps the largest in the state, was pursued by him apparently more from a sense of duty and sympathy with suffering humanity than as a source of profit. It was in the year 1849, when he was at the height of his professional success that the California fever absorbed the attention of the public, and he, partly from the love of adventure but more particularly to benefit his health, projected a party to cross the continent. His health was rather impaired than benefitted by this trip and he returned to Newark.

He was frequently a delegate to the State and National Conventions of the Democratic party, but rarely allowed his name to be used as an aspirant to any political office, although he could have obtained almost any position if he had so desired. He was also prominent in Masonic and Political circles.

He was the first President of the New Jersey Railroad, which office he held at the time of his death. He occupied this position for a period of thirty-one years—1832 to 1863, except while absent in California.

His distinguishing traits of character were his genial and generous disposition, his devotion to those whose interests were intrusted to his care, and for his ready sympathy with the suffering.

He died in Newark Oct. 22d, 1863, in the 76th year of his age.

## John P. Jackson.

John P. Jackson was born at Acquackanonck, New Jersey, in the year 1805. He was graduated from Princeton College in the year 1823, receiving the highest honors of his class. He studied law at the famous Law School at Litchfield, Connecticut. He married, in 1827, Elizabeth Wolcott, daughter of Hon. Frederick Wolcott, of Litchfield. He was admitted to the bar at Trenton in May, 1827. In 1831 he was elected to the State Legislature, and in 1832, having been re-elected, he was elevated to the position of Speaker of the House of Assembly. In 1839 he was elected Clerk of the County of Essex. After this he retired from active political life, having identified himself with the New Jersey Railroad and Transportation Company, upon the organization of that corporation in 1832 as its Secretary. For the last twelve years of his life he was the Vice-President and General Superintendent of the road, the duties of which office he discharged with great prudence and foresight. In politics he was of Whig antecedents, exerting for many years a controlling influence in shaping and directing the policy of the old Whig party, and subsequently acted with the Republican party. He was appointed by President Fillmore one of the Visitors to the West Point Military Academy, and by Governor Newell, a Trustee of the New Jersey State Normal School. He was active in religious and benevolent work.

It was in the system of internal improvement, the New Jersey Railroad, which has contributed so largely to the growth of New Jersey and the development of her resources, that Mr. Jackson was more peculiarly identified. It was to this that he devoted the best portion of his life, and exhibited, in the highest degree that energy of character for which he was so remarkable. The road under his management was especially remarkable for its financial success, and for its freedom from serious accidents.

The last annual report made previous to his death says :—

"Upwards of three millions of passengers have been transported safely since the last enumeration, making more than thirty-six millions who have been carried without loss of life or limb in the cars since our organization. For this providential interposition, so long continued, too much thankfulness cannot be felt, and with this public expression of gratitude to God, we desire to testify our appreciation of the vigilance and care of the operatives, and all connected with the management of the road."

The following is taken from the minutes of the Company at the time of his death :

"The Directors deplore and sincerely regret the death of John P. Jackson, one of the most efficient, faithful and valuable of the officers that have served this Company since the organization. In him this institution has lost an officer with a rare combination of endowments peculiarly fitted for the discharge of various duties, and whose place they cannot adequately fill.

"His faithfulness and entire devotion to the interests and prosperity of the Company were undoubted and unsurpassed. His liberal and enlightened mind fully comprehended that their prosperity was founded on providing for the public, safe, regular and frequent accommodations. His vigilance and care in the management of its financial concerns were unceasing. His energy, activity and unyielding fixedness of purpose in carrying out all plans devised for the usefulness and reputation of the work were unequaled. His skill and ability in conducting and controlling the running of the road is well testified by the unsurpassed frequency of trains running with speed and punctuality, with no loss of life, and no serious injury to any of the many millions of its passengers from the acts or neglects of the Company or its servants ; for which result so beneficial to them, they are, under Providence, indebted to his care.



"In his death, his State and Country have lost a loyal citizen, a true and zealous patriot ; society, the Church and its religious and charitable institutions, an active and devoted member—one who was not confined to good intentions and unexecuted purposes, but who aided to accomplish the plans he advocated." Mr. Jackson was an officer of the Essex County Bible and Tract Societies ; of the New Jersey Colonization Society ; of the New Jersey Historical Society, and of other benevolent and literary societies. He was, in the highest and best sense of the term, a Jerseyman. He loved his native State ; he was proud of her ; he cherished her fair name, her pure and spotless history, the memory of her distinguished sons. He had much of that quality in which our people are apt to be deficient,—local patriotism. He died in December, 1861.

## Robert Field Stockton.

Robert Field Stockton was born at Princeton, N. J., August 20, 1795. In 1811 while a student at Princeton College, he was appointed Midshipman in the U. S. Navy. In the war of 1812 he acted as aide to Commodore Rodgers, who commanded the "Guerriere" at Philadelphia. When it was found the ship was unable to go to sea, he accompanied Rodgers and his crew to assist in the defence of Baltimore.

Before active service commenced he was called to Washington and became the aide to the Secretary of the Navy. Later he resumed his post as aide to Commodore Rodgers and took part in the operations at Alexandria. He was highly commended for bravery at Baltimore and promoted to Lieutenant September 9, 1814. In May, 1815, he was assigned to the "Guerriere," Commodore Decatur's flag-ship and sailed with him to the Mediterranean, to take part in the war with Algiers. Having been promoted to First Lieutenant he was transferred soon afterward to the schooner "Spitfire," and participated in the capture of the Algerine frigate "Mahouda," and the brig "Esledie" in June 1815. In 1816 he was transferred to the ship "Erie" in the Mediterranean fleet of which vessel he soon became the executive officer.

He returned home to America in command of the "Erie" in 1821. In the summer of that year the American Colonization Society of which he was a charter member was desirous of founding a colony on the west coast of Africa and obtained his services to command the Schooner "Alligator." He sailed in the autumn of 1821 and after skillful negotiations conducted with great diplomacy obtained the concession of a large tract of land, which has since become the Republic of Liberia.

In 1822 while on a cruise in the "Alligator" he captured the French slaver "Jenne Eugenie." This action established the right to seize slavers sailing under a foreign flag. He also captured several piratical vessels in the West Indies.

In 1823 he married Maria Potter, daughter of John Potter, a wealthy citizen of South Carolina. In 1826 he obtained a long leave of absence from the Navy, and located with his family at Princeton, shortly before the first charter for "A canal from the Delaware to the Raritan River" was granted. (The terms of this charter were never complied with.)

In 1829 he became interested in the "Delaware and Raritan Canal," for which he obtained the charter, Feb. 4, 1830. He was elected President of the Canal Co. May 10, 1830, and vigorously prosecuted the work of constructing it. His whole fortune and that of his wife's family were invested in the enterprise which was completed, notwithstanding the financial crisis on account of which he was obliged to go to Europe in 1837 to negotiate a loan. He took the greatest interest in this canal during his whole life, directing its affairs with energy and enterprise. In December, 1838 he sailed in the flag-ship "Ohio" with Commodore

Hull as a fleet-captain of the Mediterranean squadron. He was promoted to Captain December 8, 1838.

While abroad on this cruise he became interested in John Ericsson's experiments with the screw propeller in England, and ordered a tug boat from him for the Delaware and Raritan Canal. He was present March 9, 1839, when this tug boat the "R. F. Stockton" named for him, made the trial trip on the Themes, which was successful to such a degree that Ericsson became the foremost Naval Engineer of his time in the adaptation of the screw propeller to ocean navigation.

The "R. F. Stockton" (subsequently called the "New Jersey,") th first vessel with an iron hull to cross the Atlantic, arrived in America i the summer of 1839. After alterations to the propeller gear it was th first successful screw steamboat that plied upon rivers of the Unite States.

He returned home in the latter part of 1839 and took active pa in the presidential canvass of 1840, advocating the election of Gener William Henry Harrison. He was offered the cabinet portfolio of Secr tary of the Navy after Tyler became President. This he declined. Th U. S. S. Princeton was built at Philadelphia by Ericsson, under his supe vision and launched early in 1844. He was afterward given command o the ship. He brought her to Washington for examination by official and members of Congress. While on a trial trip on the Potomac River the President, cabinet, and a distinguished company being on board, one of the large guns burst and killed the Secretary of State, Secretary of the Navy and several of the crew. Many other persons were seriously injured. A naval court of inquiry entirely exonerated Captain Stockton.

He sailed in the "Princeton" to Texas bearing the annexation resolutions to the government of that territory. In 1845 he served as Commander-in-Chief of the Pacific squadron on the eve of the Mexican war, having sailed around Cape Horn in the frigate "Congress" to the Sandwich Islands and thence to Monterey, where he found the squadron had captured, before his arrival, Monterey and San Francisco. By proclamation July 23, 1846 he assumed command of all American forces on the coast. With the coöperation of Col. John C. Fremont he captured San Diego and Santa Barbara, and after marching thirty miles with a naval brigade he took possession of Los Angeles, the Mexican capital of California, on the 13th of August, 1846, and appointed Col. Fremont Governor of the State. In January, 1847, negotiations were opened with the Mexican Governor and the entire province of California was ceded to the United States and evacuated by the Mexican authorities. The treaty with Mexico was subsequently confirmed by the U. S. Government. On 17th of January, 1847, he returned to San Diego and thence to Monterey where he was relieved by Commodore Wm. B. Shurbrick. His return home, overland, during the summer was a triumphal march. He was the recipient of honors in numerous irrespective of party. The Legislature of New Jersey tendered him a vote of thanks and a reception. In recognition of his distinguished services the citizens of California named for him the City of "Stockton." One of the principal Avenues in the City of San Francisco also bears his name.

Mr. Potter, his Father-in-law, having died, on May 28, 1850, he resigned from the U. S. Navy in order to settle the estate, a large portion of which was in South Carolina. He continued to take an active part in politics and was elected to United States Senate, taking his seat December 1, 1851. On the 10th of January, 1853, he resigned his seat in the Senate and retired to private life. His interest in politics however never ceased. He soon afterward became an ardent supporter of the "American Party," and was a delegate to the Peace Congress that met at Washington City, 13th of February, 1861.

He died October 7, 1866.

# NEWSPAPER COMMENTS

FROM MEMORIAL PAMPHLET ISSUED BY THE PENNSYLVANIA RAILROAD COMPANY.

CONCERNING THE RAILROAD MONUMENT AT BORDENTOWN, N. J.

[From the PUBLIC LEDGER, Philadelphia, Thursday, November 12. 1891.]

## STEAM TRANSPORTATION IN THE UNITED STATES.

To-day, at Bordentown, the Management of the Pennsylvania Railroad Company will publicly dedicate with impressive ceremony a historical monument, erected "to mark the first piece of track laid between New York and Philadelphia, and to commemorate the sixtieth anniversary of the first movement by steam upon a railway in the State of New Jersey, November 12, 1831."

The history of this "first piece of track," the laying of which is to be so imposingly commemorated, is almost the beginning of that of the railway system of the United States, for, though the efforts of Oliver Evans, John Stevens and Robert Fulton outran by several years the practical operations of steam transportation by rail, the former stating that as early as 1772 he was engaged in efforts to construct steam wagons, it was not until 1830 that the actual development of the present great system began, that year being generally accepted as the starting point of successful operation. Up to 1825 the few short lines of tramways, constructed chiefly to carry anthracite coal to the canals, were crude and inefficent, and the largest and most important of them all was the Mauch Chunk Railroad, in Pennsylvania.

The authorities differ with regard to the operation of the first locomotive engine in the United States. In 1826 John Stevens built a short circular railway, on which he ran a steam carriage of his own construction. It carried a half dozen persons, and attained a speed stated in some accounts of six and in others of twelve miles an hour. It was not, however, until 1829 that the first traffic locomotive was used on the Western continent. Here again the authorities differ, though the weight of the evidence is in favor of the claim of a steam engine imported from England in that year and put to work on a railroad fifteen miles long, running from the forks of the Dyberry to Carbondale, in Pennsylvania, the trial of which, however, was unsatisfactory, as the engine proved to be too heavy for the roadbed. The other claim is made in behalf of the Stourbridge Lion, an engine also imported from England by the Delaware and Hudson Canal Railroad Company. Mr. Allen, the engineer who ran it, died only last year.

Not counting Stevens's "steam carriage," the first locomotive constructed in this country was the Best Friend, built at the West Point Foundry. It was the third traffic engine put in use upon an American railway, the Charleston and Hamburg, which, it is stated, was the original passenger service line on this side of the Atlantic. The trial trip of the Best Friend was made in November, 1830, and it resulted in the explosion of the boiler.

The one man who, many years preceding the date of that experiment, most distinctly perceived the future possibilities of the railway system of the United States was Oliver Evans, who, in a work published in 1813, predicted: "The time will come when people will travel in stages, moved by steam engines, from one city to another almost as fast as birds fly—fifteen or twenty miles an hour. * * * A carriage will set out from Washington in the morning, the passengers will breakfast at Baltimore, dine at Philadelphia and sup at New York the same day." Robert Fulton's prophecy was more conservative. He said, at Pittsburg, in 1811: "The day will come, gentlemen—I may not live to see it, though some of you who are younger will, probably—when carriages will be drawn over these mountains by steam engines at a rate more rapid than that of the stage on the smoothest turnpike."

The genius of Fulton, great as it was, was not sufficiently great to conceive the possibility of carriages being drawn from Pittsburg to Philadelphia by steam engines at a speed, on parts of the route, of from forty to sixty miles an hour, and yet they have been. Neither Evans, Fulton nor Stevens could have imagined the Chicago limited express, with its parlor, sleeping, dining and smoking cars, as luxurious in their appointments as the apartments of the wealthiest citizen, speeding over these mountains five times

faster than the fastest stage coach on the smoothest turnpike.

A bulletin recently issued from the Census Office, containing statistics of the operations of the railroads of New York, New Jersey, Pennsylvania, Delaware, Maryland, and parts of West Virginia, shows the growth of the railway system in those States during the decade ending in 1889. In this latter year the roads in the territory indicated carried 189,079,005 passengers, as against 81,730,119 in 1880. The freight carried in 1880 was 145,733,629 tons; in 1889 it amounted to 241,939,230 tons, and the number of miles of all lines operated increased during the same period from 14,585.85 to 18,620.18.

Taking 1830 as the real starting point of the American railway system, there being then but a comparatively few miles of rails laid, and only two roads on which locomotive engines were running, the railway statistics of 1890 demonstrate not only the phenomenal growth of the railroads in the United States, but the enterprise, energy and liberality of those who have built and operated them. On the 31st of last December the aggregate railway mileage of this country was 166,817.41.

But it is not this vast mileage, nearly or quite equal to that of the rest of the civilized world, that best shows the growth of the railway system of America. That is to be largely seen in the improvement of the road—each part of which is being made as strong as the strongest—of the rails, switches, signals, of the appliances for ensuring safety, comfort or luxury and great speed. The celebration of any eventful incident of the railroad movement in the United States could not be more fitly observed than by the Pennsylvania Company, which has carried the system to the highest standard of efficiency thus far reached either here or abroad. When, indeed, the complete history of the railways of this country comes to be adequately written, it will contain no more illustrious names than those of some of the presidents, vice-presidents, engineers, and other officers of this company who did so much to develop the ideas which Evans, Fulton and Stevens evolved and so earnestly urged upon the attention of their countrymen. The railway system of the United States is not yet, in respect of any of its lines, perfect, but it is being perfected in almost every desirable particular, and especially in the essential particulars of safety, comfort and speed.

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[From the PHILADELPHIA INQUIRER, Friday, November 13, 1891.]

The celebration of the birth of the Camden and Amboy Railroad is preeminently a tribute to human progress. At first the traveler from Philadelphia to New York was ferried across the Delaware, then rode in a slow-moving train to Amboy, sixty-four miles, and then took a slow steamer around Staten Island Sound to New York, making three changes and requiring eight hours for the journey. Now the trip is made in infinitely greater com fort in two. The spirit of progress aroused by the completion of the road prompted the construction seven years later of a line to Trenton, New Brunswick and Jersey City, thus avoiding the long steamboat ride around Staten Island. Now this line from Philadelphia to New York has the distinction of earning more money per mile than any railroad in the world except the Manhattan Elevated and the London Underground, while over its tracks run the most magnificent trains in the world. In the sphere of railroad jurisprudence the Camden and Amboy road was also noted. Its earliest managers were shrewd lawyers and made their contracts with such care that very many important cases, which form the basis of railroad law at present, were decided in its favor. Few railroads in the country have played such important parts in law, politics and business as the old Camden and Amboy, whose title is now hardly known outside of legal documents.

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[From THE TIMES, Philadelphia, Nov. 12, 1891.]

### SIXTY YEARS OF STEAM.

Sixty years ago to-day the first locomotive was run upon the Camden and Amboy Railroad, and to-day the anniversary is being celebrated at Bordentown by the Pennsylvania Railroad. The memorial shaft which the great corporation of the present era is erecting on the spot where the first piece of track was laid might almost have been spared, or at least might bear the words of the tablet to Sir CHRISTOPHER WREN in St. Paul's: "Do you seek a monument? Look about you."

Sixty years ago there were but ninety-five miles of railroad completed in the country, and the annual rate of increase was but seventy-two miles. The Camden and Amboy Railroad ran its first trains at the surprising rate of fifteen miles an hour. Thousands of our older citizens can remember the time when the journey from Philadelphia to New York consumed the better part of a day. The contrast with the present can be drawn by everyone. Four tracks of steel rails connect the two cities; the time between them has been reduced to two hours; the passenger is carried by unsurpassed rolling stock over the finest roadbed in the world. New York is nearer to us than Norristown was when Jackson was President.

The development of the country and the development of the greatest of transportation agencies, the railroads, has gone hand-in-hand, and the Pennsylvania Railroad stands to-day as the type of the modern railroad. Its record is one of stupendous executive and engineering ability, and its operation testifies to the enormous power, not simply of organization, for that by itself amounts to little, but by the organization of men of clear, controlling and far-seeing minds.

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[From THE EVENING TELEGRAPH, Philadelphia, November 12, 1891.]

To-day the Pennsylvania Railroad Company commemorates its sixtieth anniversary of "the first movement by steam upon a railway in the State of New Jersey," the occasion being observed by the dedication of a monument, with suitable ceremonies, at Bordentown. The monument marks the first piece of track laid between New York and Philadelphia, and although his track does not now constitute at part of the line between the two greatest cities in America, it became a part of the vast system of the Pennsylvania Railroad when this company succeeded to the United Companies of New Jersey, and so still remains. The celebration to-day is not only local, but may be regarded as of general consequence, since the laying of that bit of track was the beginning of the existing transit system across the State of New Jersey on which such incalculably important interests depend. It was but a small beginning, and was not immediately followed by any considerable development, as during the next five years after 1831 there were not fifty miles of rail laid in the State. It was a beginning, however, and it is worthy of note that this beginning was made within the memory of men still living. The young people of that day have seen the birth, growth and development of the entire railroad system of this country. A system inaugurated by a few disconnected little tramways in their early days has been gradually extended over the length and breadth of this continent, stretching from the Atlantic to the Pacific, and from the Great Lakes to the Gulf of Mexico. No other generation ever saw such a work done by human hands, and it is impossible for the mind to conceive that any future generation can see such another task accomplished.

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[From INVENTIVE AGE, Washington, D. C., November 17, 1891.]

### A MILESTONE ON THE HIGHWAY OF HISTORY.

#### A Monument That Marks the First Piece of Track Laid Between New York and Philadelphia.

More and more the work of the inventor is appreciated by mankind. More and more the thinking people of the earth begin to understand that but for invention the world of commercial and industrial activity would be a stagnant sphere. On the 12th inst. there was an interesting celebration at Bordentown, New Jersey, to celebrate the completion of the handsome monument erected by the Pennsylvania Railroad Company to mark the first piece of track laid between New York and Philadelphia, and also to commemorate the sixtieth anniversary of the first movement by steam upon a railway in the State of New Jersey.

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[From THE RAILROAD AND ENGINEERING JOURNAL, December, 1891.]

The monument at Bordentown, which is elsewhere described, is worthy of imitation, not only because it is in itself very simple, tasteful and appropriate, but also because such me-

morials should be increased in number. It is an excellent practice to preserve the memory of historical events by monuments, and the railroad history is fully as important in its way as the political and warlike history of the nation. Much credit is due to Mr. Watkins for suggesting the Bordentown monument, and to the officers of the Pennsylvania Railroad Company for the way in which the suggestion has been carried out.

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From THE RAILROAD AND ENGINEERING JOURNAL, December, 1891.]

### THE BORDENTOWN MONUMENT.

An interesting ceremony took place at Bordentown, N. J., on November 12, when the monument which the Pennsylvania Railroad recently completed there to commemorate the first laying of track in New Jersey was dedicated. The first track on the Camden and Amboy Railroad was laid near Bordentown in the summer of 1831, and the old locomotive, John Bull, which had been purchased for the road in England by Mr. John Stevens, was put upon the track in that year. Two passenger cars were built, and the first passenger train over the new track, which was then completed somewhat less than a mile, was run on November 12, 1831, conveying the members of the New Jersey Legislature, who had been brought down from Trenton for the purpose of convincing them that the operation of a railroad by steam was feasible.

The monument was thus dedicated on the sixtieth anniversary of the running of the first train, which seemed a very fitting opportunity.

The erection of such a memorial was first suggested by Mr. J. Elfreth Watkins, who is now Curator of the Transportation Department of the National Museum at Washington, but was formerly employed on the Pennsylvania Railroad as a civil engineer. The plan was cordially approved and taken up by the officers of the company, and the monument was erected under the immediate supervision of Mr. J. T. Richards, the assistant chief engineer.

The ceremonies at the dedication of the monument were simple and impressive. A number of guests were brought by special train from Philadelphia, Trenton and other places, including, it was stated, one gentleman who rode upon the first train at the original trial trip in 1831. Mr. Isaac Dripps, who was afterward master mechanic of the Pennsylvania Railroad, was the engineer of the first train, and had been previously engaged in putting together the old locomotive John Bull, when it arrived from England. He is still alive and a resident of Philadelphia, but was, unfortunately, unable to come. A platform for the convenience of guests and speakers had been arranged alongside of the track, and General Stryker, Vice-President of the New Jersey Historical Society, was called upon to preside. With a few well-chosen words he introduced Mr. J. T. Richards, under whose charge, as above noted, the monument was built, who made a brief address, reciting the circumstances under which the monument was built, and transferring it to the custody of the United New Jersey Railroad and Canal Company. An address of acceptance on the part of that company by Mr. F. Wolcott Jackson, General Superintendent of the United Railroads of New Jersey Division, and then the main address of the day was made by Mr. Watkins. It was historical in its nature, giving an account of the organization of the Camden and Amboy Company, the difficulties which attended the first construction of the road, and its subsequent history, and referred at considerable length to the very important part taken by Mr. John Stevens and his sons in the building of the road and the designing of its substructure and rolling stock. It was exceedingly interesting in its nature, and we regret very much that space prevents us from reproducing it in full.

It is hoped that the good example thus set out at Bordentown will be followed elsewhere, and that memorials commemorating the prominent events of our railroad history may be erected elsewhere. The Bordentown monument is simple and tasteful, and well adapted to the surroundings and circumstances, and it is solid enough to remain there to notify travelers for generations to come.



[From THE RAILWAY REVIEW, Chicago, November 14, 1891.]

The sixtieth anniversary of the running of the first train in New Jersey by a steam locomotive was appropriately celebrated near Bordentown on Thursday, November 12. The short stretch of track on which the train ran has been designated by two simple monuments, one at each end, in the larger of which there has been utilized some of the materials which formed the original roadway of that historic track; and in this manner there has been preserved a remembrance of the humble beginnings of the vast railway systems which have since spread over this country, and of that system which, in many respects, leads them all. The fact that the engineer who ran the first locomotive on this piece of track still lives makes us realize in some measure how short is the time in which this great development of the railway has taken place, as well as how great is that development. It is very fitting that railroad officials should thus take time from their busy hours to commemorate a matter of such historic interest, and the company which has taken the initiative in this work is to be commended for the spirit it has shown.

Mr. J. T. Richards, assistant chief engineer of the Pennsylvania Railroad, in an appropriate speech transferred the monuments to the custody of the United New Jersey Railroad and Canal Company, and Mr. F. W. Jackson, general superintendent of the latter company, accepted the monument in a neat speech. An address was also delivered by J. E. Watkins, of the Smithsonian Institution, in which he gave an account of the origin and early history of the Camden and Amboy railroad. This stretch of track, which is thus staked off by the monuments erected, is the first piece of track laid between New York and Philadelphia. Below are given the speeches of Messrs. J. T. Richards and F. W. Jackson, but want of space compels the reservation till a later issue of the publication of the more important parts of the address of Mr. Watkins.

[The *Review* published the drawings and description of the monument in the issue of December 19, 1891.]

[From THE RAILROAD GAZETTE, New York, November 13, 1891.]

Yesterday afternoon an interesting ceremony took place at Bordentown, New Jersey. It was on the completion of the monument erected by the Pennsylvania Railroad Company to mark the first piece of track laid between New York and Philadelphia and to commemorate the sixtieth anniversary of the first movement by steam upon a railroad in the State of New Jersey, November 12, 1831. The formal ceremonies included an address of presentation by Mr. J. T. Richards, assistant chief engineer of the Pennsylvania; one of acceptance by Mr. F. Wolcott Jackson, general superintendent United Railroads of New Jersey, and an historical address by Mr. J. Elfreth Watkins, curator U. S. National Museum. The limits of the first section of track laid were carefully ascertained and are marked by two monuments. We quote from Mr. Richards: "The larger monument needs an explanation, as its manner of construction is a matter of history well worth preserving. The foundation stones are the original blocks upon which the rails were originally laid—cut to form a proper bond for masonry. The rail is from the original track, 42 lbs. per yard in weight. The joints are from the original track, as are also the spikes which we have gathered for the purpose—the stone blocks placed as supports for the rail are arranged without hammer dressing to show their original shape, and the cube of granite is a fitting milestone in the history of the railroad."

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[From THE ENGINEERING NEWS, New York, November 14, 1891.]

The first movement by steam on a railway in the State of New Jersey was celebrated at Bordentown on November 12 by the management of the Pennsylvania Railway Company. The occasion was the sixtieth anniversary of the laying of the first piece of track on the Camden and Amboy Railway on November 12, 1831, and a massive monument of granite has been erected to commemorate the event. The address of presentation was made by Mr. Joseph T. Richards, assistant chief engineer, Pennsylvania Railroad, and

the monument was accepted by Mr. F. Wolcott Jackson, general superintendent of the United Railroads of New Jersey. Mr. J. Elfreth Watkins, of the U. S. National Museum, Washington, D. C., delivered an historical address on the Camden and Amboy Railway.

[The *Engineering News* published the drawings and description of the monument in the issue of December 12, 1891.]

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[From THE RAILWAY MASTER MECHANIC, Chicago, December, 1891.]

On November 12th a large number of railway officials assembled near Bordentown, N. J., on the Pennsylvania Railroad to celebrate the sixtieth anniversary of the trial trip of the first steam locomotive and train of cars operated in New Jersey. The locomotive which made this trip on November 12, 1831, was the "John Bull," purchased in England and brought to America. At each end of the section of track on which the trial was made, the Pennsylvania Railroad has erected a monument commemorating the event. The larger one is in the form of a plain substantial shaft, which is supported on foundations made from the stone blocks upon which the original rails were placed. Around the base of the monument there is a rail which is a part of the first track laid. Mr. J. T. Richards, assistant chief engineer of the Pennsylvania Railroad, in an appropriate speech transferred the monument to the custody of the United New Jersey Railroad and Canal Company, and Mr. F. W. Jackson, general superintendent of the latter company, accepted the monument in a brief address. A historical address of much interest was also delivered by Mr. J. E. Watkins, of the Smithsonian Institution. The track thus staked off by the monuments was the first piece of track laid between New York and Philadelphia.

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[From THE IRON AGE, New York, Nov. 19, 1891]

**PROGRESS OF THE LOCOMOTIVE.**

An impressive ceremony took place at Bordentown, N. J., on the 12th inst. at the formal completion of a monument erected to mark the spot where sixty years ago the first piece of track was laid between New York and Philadelphia, inaugurating the present railway system of the United States. Before that date only a few desultory efforts had been made to introduce steam transportation by rail, and these mostly of an experimental character. The monument is a granite monolith five feet square, resting on a circular pedestal of granite blocks, upon which were placed the original rails of the roadbed. Upon this pedestal rest a dozen other blocks of granite with a similar history, and upon these blocks is spiked with original spikes one of the first rails laid, which has been bent into a circle. On a bronze relief is pictured the historical locomotive John Bull and the queer looking train of three cars that it first hauled over the Camden and Amboy road. These dedicatory ceremonies consisted of an address of presentation by Joseph T. Richards, assistant chief engineer of the Pennsylvania Railroad, an address of acceptance by F. Wolcott Jackson, general superintendent United Railroads of New Jersey Division, Pennsylvania Railroad Company, and an historical address: "The Camden and Amboy Railroad, Origin and Early History," by J. Elfreth Watkins, curator of the section of transportation and engineering, United States Museum, Smithsonian Institution, Washington, who was once the assistant engineer of the railroad company.

Mr. Watkins referred to the early days when Perth Amboy was a rival of New York and to the competition for traffic that resulted in the granting of a charter to the Camden and Amboy Railroad, and to the Delaware and Raritan Canal Company.

Mr. Watkins also went into the general development of the railroad system of New Jersey, by the absorption of the Camden and Amboy and other lines into the great Pennsylvania system. He concluded with a splendid tribute to the part that the railroad has played in the progress of the world.

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[From THE BORDENTOWN REGISTER, November 20, 1891.]

**THE RAILROAD MONUMENT.**

The *Register* report of the dedication of the "Johnny Bull" Monument, as it is called, covered the essential features of the day. A large number of distinguished persons were present. The plans were handed to Mr. R. P. Snowden, engineer of the Amboy Division, who attended to the execution of the same. Of course, Superintendent Ellmaker and Supervisor Potter, of the Amboy Division, played important parts in the work. Altogether the matter was attended to well from the inception to the dedication. The historical part, which fell to the lot of Mr. J. E. Watkins, may be regarded as the effort of his life. It was the result of years of research and earnest study, and Mr. Watkins has won for himself golden opinions for the perfect manner in which he has discharged his all important task. Coroner Enoch Deworth, "boss" mason of the Amboy Division, had the honor of erecting the "Johnny Bull" monument.



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[From the BALTIMORE SUN, Jan. 18, 1892.]

**CORNER-STONE OF THE BALTIMORE AND SUSQUEHANNA RAILROAD.**

**Accidental Discovery by Mr. George C. Wilkins—The Inscriptions.**

Mr. George C. Wilkins, general agent of the Northern Central Railway, recently discovered the corner-stone of the Baltimore and Susquehanna Railroad, now part of the Northern Central system, and has had it placed in the south wall of the Northern Central Railway Company's Building, corner of Centre and Calvert streets. The stone is of Port Deposit granite, four feet three inches high, two feet two and one-half inches broad and six inches thick. It has been sunk into the brick wall, and is a few feet from the ground. The stone bears the inscription, "B. S. R. R., Aug. 8th, 1829," in three lines. After searching the records of Masonry and the reports of the railroad company, Mr. Wilkins caused the following inscription to be engraved on a brass tablet, which is placed on the wall above the stone:

"This corner-stone of the Baltimore and Susquehanna Railroad was laid by the Grand Lodge of Masons of the State of Maryland on the 8th day of August, 1829, at the request of the president and board of directors of the Baltimore and Susquehanna Railroad Company, it being the one hundredth anniversary of the founding of the city of Baltimore.

"The stone was originally placed at a point on the northwest boundary line of the city of Baltimore, about thirty feet east of the centre line of the Baltimore and Susquehanna Railroad, a section of which had been graded in a northerly direction for the distance of a quarter to a half-mile.

"The stone was removed from its original position on October 28, 1870, in consequence of the construction of the tunnel of the Baltimore and Potomac Railroad. It was finally placed on the south wall of the general office building of the Northern Central Railway Company, southeast corner of Calvert and Centre streets, on the 4th day of December, 1891, the thirty-seventh anniversary of the consolidation of the Baltimore and Susquehanna, the York and Cumberland and the Susquehanna Railroads into one corporation — the Northern Central Railway Company."

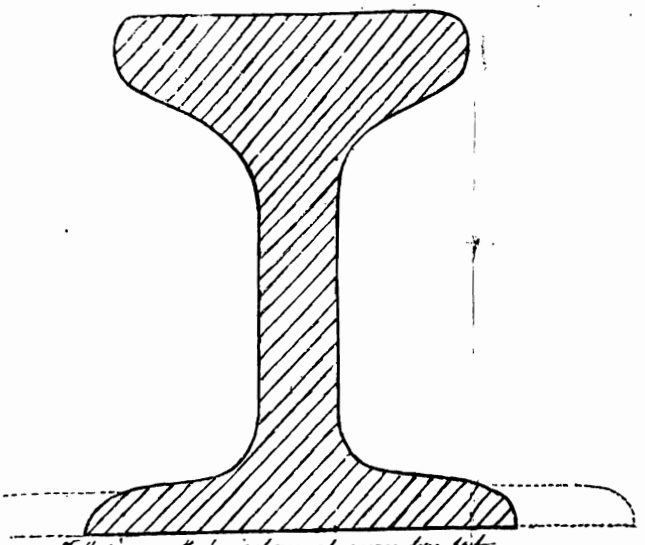
*The thought of resurrecting the corner-stone of the Northern Central was suggested to Mr. Wilkins by the erection of a monument in New Jersey some time ago to commemorate the building of the first mile of track in the Pennsylvania Railroad system*, but the whereabouts of the stone was discovered unexpectedly. Looking from his office window one day, Mr. Wilkins noticed lettering upon one of the stones in the wall supporting the fence on Calvert street, south of the office building. The stone was discolored, but upon being cleaned the inscription revealed the importance of the discovery, and the stone was removed to its present conspicuous position.

The ceremonies attending the laying of the stone in 1829 are fully described in Masonic records. The gavel used upon that occasion is stated to have been the "identical instrument employed by General Washington in laying the corner-stone of the Capitol at the seat of the general government."

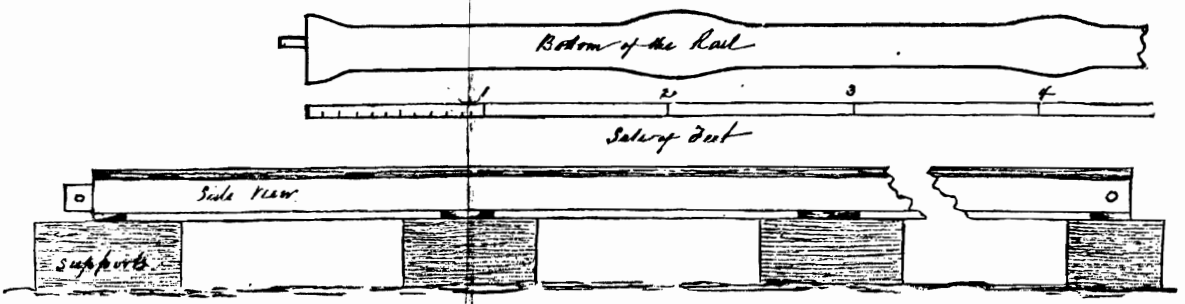
The first section of the Baltimore and Susquehanna Railroad from Belvidere depot, corner of North and

Eager streets, to the Relay House, was opened July 4, 1831, and to Timonium and Owings's Mills in 1832. The superstructure on this part of the road was a six-inch-square string piece tied together by notched sleepers three feet apart and capped by an iron bar or flat rail two inches wide and one-half inch thick. Horse power was used until the locomotive Herald was imported from England and put on the road in October, 1832. This locomotive was ordered in March, 1832, and was ready in Liverpool for six months before a vessel could be obtained to take it. It is said to have been the third locomotive operated in this country. The road was completed to York in August, 1838.

The Wrightsville, York and Gettysburg Railroad Company was chartered in 1835 by the State of Pennsylvania, and the road was completed in April, 1840, making a continuous railway between Baltimore and Columbia, at which point the canals of Pennsylvania commenced, extending to Pittsburg on the west and Wilkesbarre on the north. The completion of the road to Columbia opened a communication to Pittsburg on equal terms with Philadelphia. In 1846 the York and Cumberland Railroad was chartered to build a railroad from York to Bridgeport, opposite to Harrisburg. This road was opened for travel in February, 1851, making at the latter point a connection with the Pennsylvania Railroad to Pittsburg. The three roads described were consolidated into the Northern Central Railway Company on December 4, 1854.



Full size with projections at every two feet on the bottom flange. 3/4 of an inch by 4 inches.




Liverpool November 26 1830.

Gentlemen

At what rate will you contract to deliver at Liverpool; say from five to six hundred tons of Railway of the best quality Iron rolled to the above pattern in twelve or fourteen feet lengths, to lap as shewn in the drawing, with one hole at each end, and the projections on the lower flange at every two feet. Cash on delivery. How soon could you make the first delivery, and at what rate pr month until the whole is complete. Should the terms suit and the work give satisfaction a more extended order is likely to follow, as this is but about one sixth part of the quantity required. Please to address your answer (as soon as convenient) to the care of Francis B Ogden, Consul of the United States at Liverpool.

I am

Your obedient Servant

Robt L Stevens

President & Engineer of the Camden & South Amboy Railroad & transportation Company